U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

TECHNICAL WORKSHOP

RANGE & WILDLIFE

SOCORRO, NEW MEXICO
APRIL 25-29

RAWLINS, WYOMING
MAY 15-20

WINNEMUCCA, NEVADA
MAY 19-23

1966

RANGE AND WILDLIFE TECHNICAL WORKSHOP

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RANGE MANAGEMENT-WILDLIFE TRAINING CONFERENCE

Winnemucca, Nevada

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Buzan, Martin	Reno, Nevada
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Gretz, Darrell	Bend, Oregon F&WL
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BUREAU OF LAND MANAGEMENT
RANGE MANAGEMENT-WILDLIFE TRAINING CONFERENCE
Rawlins, Wyoming
May 16 - 20, 1966

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WELCOME TO NEW MEXICO AND TO THE SOCORRO DISTRICT

W. J. Anderson
State Director

Socorro, New Mexico, April 25, 1966

Welcome to New Mexico and welcome to the Socorro District. Virgil Pate and his staff people have arranged facilities and accommodations. We certainly express our appreciation. We hope to arrange for a larger meeting room so that we can be more comfortable. Pate is looking into this possibility.

This is the first of three field sessions on Standards and Technology of the range management and wildlife management programs of the Bureau. Accordingly, this is your meeting and I hope that each of you will participate openly and freely. The agenda shows moderators for each of the sessions. We will look to Glen Fulcher to serve as general chairman, and I hope he will keep us on target. It is a pleasure also to have Ed Zaidlicz with us, at least for the first part of the conference. If any of you need transportation to make plane connections, let us know and we will see to it that you make those connections. I understand that George Lea will have to return to Washington tomorrow morning, and we certainly will get him to the plane.

Looking over this crowd, it is a real pleasure to meet again personally with a few old mossbacks in the group, along with the newcomers. It is a real personal pleasure to be able to visit again, even though briefly, with such mossbacks as Francis Riordan of Arizona; Tommy Thompson of Colorado; Don Dimock who grew up with the hills in Nevada but who now is in California; and a couple of our fellows here in New Mexico who have been in this business since the early thirties. These are Gabe Cowart of the Las Cruces District and Trogstad from our State Office.

If we were to bundle up the experience of just those five we would have to have a pretty big truck to haul the package. Really, it has been the devotion to duty that these fellows have shown that has kept BLM going forward in spite of financial setbacks, changes in policy, frustrations from the political arena, and all of the many adverse situations with which BLM has been confronted time and again over the years.

They compare with the newcomers, one of whom is signing in this morning in Albuquerque and will be delayed till one o'clock this afternoon to get to this meeting. When he arrives he will have four hours experience with BLM. But to everyone of you, mossback or newcomer, or in between, you certainly are welcome and I hope this is a profitable conference for each of you.

We are always being confronted with new policy emphasis and policy changes. In reality, this is part of our official lives. Policy is like a pendulum that keeps swinging back and forth with emphasis on some major item this year followed by shift to major emphasis on some other item next year, and back and forth we go. Each of us has to be alert to the position of the policy pendulum if we want to undertake initiative on our own with regard to some local problem. We want to make sure that we are in tune with the desires of the Director's office lest we become subjected to criticism for not following the proper priority at the time in question.

Most of us who have been in this game for very many years remember our own personal experiences and frustrations. The man years that went into the Deming Two-Phase and into the Parker Three-Step methods of range evaluation are examples. Now both of these methods have been scrapped and discarded. If there is anyone in this room who does not realize that both of those systems are out (and completely out), I hope you will raise your question so that you will be able to leave here realizing completely that you will waste no further time on either system even though you may personally have spent many, many months on either one or both of them.

Now we are going into range management plans more intensely and on a more practical basis in which we will obtain data on production, actual use, degree of utilization, trend, and that sort of thing. I sincerely hope that three years from now, or five years from now, we will not be confronted with abandoning this undertaking under such possible terminology as the "Fulcher Waltz" or some other terminology that might be applied to it. The real basis of our undertaking now is to get onto a practical system that we intend to use over the decades ahead.

Each of us in the Division of Resource Management, and in Standards and Technology, must realize that our operations must tie in as parts of the overall BLM team undertaking. I am reminded of a statement that Under Secretary Carver made to the Southwest Field Committee last summer. He said that the Department of the Interior is not a closely knit team of cooperating agencies. Rather, he said, it is a federation of warring bureaus. The same thing can be applied within BLM, as among States and among divisions, especially when it comes to dividing the available monies. The basic problem, however, is one of being able to assure teamwork, regardless of your position individually within the Bureau.

We have to be set for new programs and new emphasis as directed by the Congress or by the President. Right now we are undertaking broad classification of the remaining vacant public domain lands under the 1964 Act. This is a Bureau-wide undertaking and each of us should play an active part. This classification comes primarily under the lands and minerals program management function, but the resource management function can lend valuable support and this can be done in such a way as to result, over the long term, in actually reducing

the workload resting on the shoulders of resource management. This is in fact a possible cost reduction and manpower utilization project as well as land classification.

I mentioned initiative as well as teamwork. The potential initiative represented in this room is unlimited. This is one of the challenges that should make us proud to be a part of BLM. It certainly gives me personal pride. We are standing on our own acre of diamonds, so to speak, and our accomplishments can be measured five years from now or ten years from now in large measure by the degree to which we individually exercise initiative and teamwork.

I want to mention one other thing which to me is quite important in a conference of this kind. We are subject to criticism. This is as common as breathing. Also, we are just as subject to criticism internally as we are from the outside. We should welcome constructive criticism and we should be able and willing to accept constructive criticism, not from a personal viewpoint, but rather from the standpoint of the specific office which we hold. If we can accept criticism on the basis of our position and our responsibility without taking personal offense, we will produce a much more valuable total accomplishment. The fellow who can accept criticism officially without accepting it personally is the kind of guy who spends most of his subconscious time searching for windows so that he can see out and he is not bothered by spending the majority of his subconscious energy looking into mirrors. The fellow who accepts criticism only in the personal vein cannot produce his best for the Bureau. He is too much an introvert and he is not a team member. In this work, you have to at least have the veneer of an extrovert if you are going to be the outgoing kind of individual which the Bureau's work requires.

Another advantage of a conference of this kind is that each of us can learn something by finding out how the other fellow in another district or in another state goes about his job when he is confronted with problems similar to the ones we have. Through this channel you can develop teamwork more effectively.

We are not yet confronted with PPBS. Fortunately, the Director is going through all of the initial pains of reaching for an understanding so that when it comes to us in the field we can have better instructions and guidelines. It will require the best intelligence of each of us to understand the system when we get it. It will not be a subject of this conference but it may come up for brief discussion. If we become involved in any long-winded discussion of PPBS or some other "foreign" problem, I hope our chairman will pull us up short and put us back on our target for this conference.

There is one additional thing I think we should not overlook: planning is a process. The agenda calls for some discussion of management plans. Please remember that planning is a process and a plan developed just to have a plan is not the Bureau objective. Planning as a process is a

tool through which we can obtain better management if we keep our plans loose enough to amend them and update them as conditions change. We cannot forget that the District Manager is responsible for decisions and good management plans can help him fulfill that responsibility.

The planning process is like a benzine ring. In the first portion the District Manager and his staff have their antennas out and are collecting all the factual data possible with regard to the particular area or particular problem. The central horizontal lines embrace the period of analysis and sorting of the facts. The concluding closure of the benzine ring represents making the decision. We go through this process every day whether we realize it or not.

There is another item I would like to mention. It is cancer discipline. The specialist in any technical field realizes full well that his discipline is the center of Bureau operations and is the center of all society. Everything revolves around his discipline. If he does not feel that way, he is not a good technician in his field. I hope each of us recognizes, however, that there are other disciplines and in order to perfect teamwork, each of us can push our own discipline and push it vigorously just so long as it does not cripple some other activity of the Bureau.

Again, I hope you have a good conference and that you will participate in it freely.

TALK BY WYOMING STATE DIRECTOR ED PIERSON
before
THE RANGE AND WILDLIFE TECHNICAL TRAINING WORKSHOP
Rawlins, Wyoming - May 16-20, 1966
Jeffrey Memorial Center

I wish to add my welcome to that already extended you by the Acting Mayor, and District Manager Warren Gray. I heartily agree with the idea of this meeting--and at this time. I feel we are at the cross-roads of range and wildlife management in the Bureau. We are entering into some new and urgently needed concepts in resource administration. We, in Wyoming, welcome the Bureau policy of winding up range adjudication and getting into the more important job of on-the-ground range and wildlife management. I also feel that we are now in a good position to move in this new direction since I sense a settling down in the Bureau from the recent reorganization. The recently enacted Multiple Use and Classification Act and associated laws support this new emphasis.

I realize that policy is not made at meetings such as this; however, from the discussion of this type of meeting information might emerge which is needed to resolve some conflict in range management theory. I refer to Assistant Secretary Carver's statement before a National Wool Growers Meeting, to the effect that more latitude, responsibility, flexibility and self-policing should be extended the range user. This policy announcement seems to conflict, in part at least, with the announced intention to develop more detailed range management plans, such as rest rotation, and to give greater attention to the on-the-ground details of range management plans. I personally don't think that the two concepts need be in conflict. I wonder,

however, if we all have a clear and common understanding of this question, and are we giving it similar explanations to the public?

In the recent past we have heard it said that the Bureau is de-emphasizing range management. I do not feel that we have, or can, de-emphasize this important basic activity. Instead, I would rather believe that we have emphasized other programs and have certainly not intentionally de-emphasized the range work. Regardless of where the emphasis is placed, there is scarcely any program or activity in the Bureau that is not in some manner related to range and wildlife management.

We must keep abreast of new technical developments if we are to stay competitive in modern range and wildlife management. This, I understand, is one of the underlying purposes of this meeting.

In preparing for my appearance here, I thought that the recently issued "Occupational Study of Resource Management positions in District Offices" (Instruction Memo No. 66-181) was pertinent. Quoting from this study, "In many of our districts multiple use management notwithstanding, range and grazing have been and continue to be the dominant use, at least for the foreseeable future". Concerning the qualifications required for natural resource specialists, or management positions, the study finds that it is unrealistic to find employees with all the skills needed for management positions in the Bureau. Rather, it is more practical to develop "land management generalists" from persons having a professional background in the broad field of conservation and management of land and its resources. I fully agree with these two

excerpts from the study and I believe it speaks well for the career opportunities of you here in attendance today who are, for the most part, range and wildlife technicians. In other words, I am voicing a strictly unprofessional, personal opinion, to the effect that the bulk of our line managers and key leaders in the Bureau should come from the professional ranks.

In closing, I might mention three Wyoming problems which appear to be having Bureau-wide implications:

One, of course, is the antelope-fence controversy, which has culminated in the recently issued directive, Instruction Memo No. 66-171. This provides as you know, for the issuance of a certified notice to all range users requiring that they submit applications for any unauthorized range improvements before September 30, 1966. This may seem like a rather drastic requirement to place on district offices, in view of your many other duties. Let me assure you, however, that the Director's Office had no alternative but to take this type action. It was necessary due to the tremendous outside pressure and particularly political pressure bearing on the problem.

Second, is what we call the agricultural trespass problem. This is where odds and ends of public lands have been included in irrigated hay meadows due to the early day establishment of irrigation systems without regard to private-public boundaries. We have usually several acres involved in each of these cases, but some involve over 100 acres. No existing law appears suitable to get these areas into private ownership, so a special law has been introduced and is pending in Congress to take care of this problem. It is an amendment to the second priviso of the existing

Public Sale Act. I am sure other states will have use for this statute if and when it passes Congress.

The third problem is that of wild horses, which you have heard a lot about lately. While the main focus appears to be in Montana at this time, we estimate several thousands of these unpermitted animals are becoming a serious problem in Wyoming. We are preparing a "Position Statement", citing the need for a Bureau policy on these feral horses. One part of the statement will bear on the "heritage" question, pointing out these animals are not true descendants of the original mustang. We suggest further legal research as to whether or not it is legally possible to reserve forage for these horses in States where they are not, under State law, designated as a"wild animal". A second legal question involves the authority to set aside range exclusively for these animals. We believe the vast amount of public attention stemming from the recent Montana-Wyoming situation necessitates a clear cut and legally sound Bureau policy. We are hopeful that some economically feasible means of control will be forthcoming. This may entail an amendment to the "Wildhorse Annie Law".

I regret that I cannot be with you during the entire session.

RANGE AND WILDLIFE TRAINING CONFERENCE
WINNEMUCCA & RAWLINS

Opening Remarks
by
Glen D. Fulcher (George Lea)

We are very glad to be here and happy to see the excellent crowd. We are particularly happy to see those here from other agencies and colleges and universities. It is a pleasure to meet here in the field, where the Bureau's programs are located.

Why are we here? - -

This meeting is the end result of a two-year gestation period. Although you may be expecting big and new ideas, we haven't come up with a new baby; - - just a continuation of our on-going program with increased emphasis on resource management. We do intend to discuss the future. Very little time is scheduled to discuss the past.

What are we proposing? - - Merely a management effort that we have all recognized could be accomplished if and when funds and labor and time become available.

Is range management being de-emphasized? - - This is not our intention, but at the same time we must be aware of the other uses and the total land uses. We are, however, emphasizing other uses. Range Management is a part of the total picture. We believe range management is a basic building block for other uses. In the case of wildlife, they are inseparable.

We have been accused of being a livestock staff, but vegetation management--not livestock production--is our objective. We are here to discuss vegetative management. However, livestock grazing is an important and integral part of multiple use. A stabilized livestock industry is an important objective also. Proper grazing does not compete with multiple use but complements it. Overgrazing and abusive use is what brings us and the industry criticism. Often overgrazing and abusive vegetation use does not result from too many animals but lack of proper management of livestock and the land resource. Malad Unit in Burley is an example. Here we examined the situation with our best technicians and found potential under management. We replaced reductions with restoration grazing management as a trial. After all, grazing capacity as shown by our conventional range surveys is relative depending upon the type management,

Where are we in the Bureau? --

1. Adjudication near completion.
2. We should be moving away from record keeping. We should be getting out of the Grazing Privilege Account Service.

3. We now have the opportunity to devote more time to true management - deemphasizing custodial management, base property regulations, dependent property surveys, and range surveys.
4. The adjudication process has produced a sound basis for management.

What are our objectives? - -

Are we trying to maximize forage production? No. Have we been? Yes. We are trying to obtain a high level of sustained yield of forage while improving range conditions - consistent with other uses. If we are able to continue meeting existing qualified demand Bureau-wide, plus improvement in range conditions, we will be doing well. Our principal objective is to intensify BLM's management of the grazing resource. There are localized areas where we may produce large excesses of forage but no great increases overall are contemplated in foreseeable future. We must analyze and justify our program from a cost/benefit standpoint. Even at $2.50/AUM it is difficult to justify much increase in forage.

What tools and procedures do we have?

Are our present procedures adequate? If not, why not?
Why did we drop the Deming 2-phase and Parker 3-step methods? Dr. Schuster from Texas Tech and Dr. Kinsinger made a study that told us what we have been saying to ourselves about the value of these methods to our program. They concluded that neither of the methods provide sound information upon which management decisions can be made. Perhaps we were wrong. This left us without study methods. We have been criticized -- rightfully so. However, we now believe we have some of the procedures you need; some of these are in final forms, some in draft form.

What we have tried to do?

1. We have tried to limit the workload to a minimum.
2. As a minimum:

    a. We need an allotment management plan containing a grazing system on all allotments.
    b. We need efficient means of evaluating the effectiveness of the management plan.

3. A word of caution. We want you to prepare only those number of plans you can supervise and handle. We don't want "paper plans." Please keep this in mind during this session.
4. We have tried to keep things simple, requiring the least amount of work, yet adequate to do the job.

5. We have tried to make you land managers rather than legal managers. The program breaks into three separate and distinct parts:

    a. Plan
    b. Studies
    c. Evaluation

I want to stress the workload aspects again. We had at one time a 4-inch study manual draft that contained 36 forms, but it was too complicated.

Most of these are guidelines--not a cookbook approach. Some are policy. You are the people that will carry out effective range management. We have tried to provide you the guidelines and flexibility in application of management.

This conference provides us a chance to get feedback and try to explain what we think we have said. The English language is subject to many interpretations and connotations. We are often not sure what we have said until we are able to get a reading and feedback on the field's interpretation. It is a little like our laws, one must wait for court interpretation to tell us what the laws really mean.

The most important point of our meeting will be the discussion period. Our crowd is large, but we hope this will not limit discussion. Please ask questions -- take us apart -- we don't have thin skins -- we welcome your constructive criticism.

Our main objective, then, is to obtain a balanced program for the lands we manage containing the best possible range program. We again welcome your suggestions that will help develop the best procedures to reach that goal.

WILDLIFE MANAGEMENT

Robert J. Smith

The Bureau's responsibility under the Taylor Act and the Multiple Use and Classification Act is to manage and develop habitat necessary to obtain a sustained yield of fish and wildlife consistent with other multiple use considerations and to provide access for the utilization of fish and wildlife, all under appropriate coordination with interested State and Federal agencies.

The program relates to wildlife habitat with the primary objectives of:

(1) Identification of lands with important wildlife and fishery values, and the identification of key or critical areas, (2) protection of these values where there is either existing or potential competition from the other multiple uses, (3) enhancement of these values where possible, (4) provisions for access where needed, and (5) carrying out needed studies and research.

BLM is (1) providing manpower trained to recognize wildlife needs, coordinate with other activities, conduct studies, recommend developments, supervise construction, and recommend for these activities at the district, and State levels in budget submissions, and (2) providing adequate funds for capital improvement projects in which wildlife will receive primary as well as incidental benefits. Of the two, the first is the most important.

The primary function of the wildlife specialist at the State level is program management, including program coordination of wildlife activities within the State, liaison with State and Federal wildlife agencies and private conservation organizations, supervision of district programs and budgetary review.

At the district level wildlife trained BLM personnel are being given the responsibility of wildlife work. There are about 70 BLM personnel with wildlife training presently working in districts, but few are actively working in wildlife phases of the operation.

The following are actions begun in fiscal 65 & 66 to accelerate the wildlife program in 67.

1. Revise master memorandums of understanding with State wildlife agencies to provide for new program emphasis, for example:

(a) Identify lands with significant wildlife values emphasizing identification of key and critical areas.

(b) Provide for cooperative studies in critical areas.

(c) Establish annual meetings to discuss program emphasis, problems, cooperation, game management techniques, etc.

(d) Provide for cooperative habitat improvement programs.

(e) Provide special use permits for wildlife development projects.

2. Speed up processing of applications for R&PP and Coordination Act withdrawals in line with Instruction Memorandum 64-572 which established policy for handling applications for lands with significant recreation or wildlife values.

3. Initiate studies with BSF&W regarding the need for retention in their present form of game ranges under joint jurisdiction of BLM and BSF. The alternative is for the BLM to manage these areas under the principles of multiple-use management with wildlife given a priority and the lands retained under withdrawal.

4. Fully implement the provisions of Senate Document 97. Procedures outlined in this document have not been properly used by the agencies involved, including the BLM. This is an opportunity to enhance public land management with particular emphasis on recreation and wildlife values.

5. Accelerate the development and use of economic studies, research data, and other information for the benefit of wildlife management.

6. Institute procedures which will provide for more BLM participation in planning predator control programs to be carried out on the public lands.

7. Continue identification of benefits and costs of the wildlife program for use in the 67 and future budgets.

8. Emphasize integration of wildlife habitat data into planning unit plans and training of unit personnel in integrated multiple use management.

9. Coordinate access needs with road construction program.

BASIC REQUIREMENTS (ECOLOGY, PHYSIOLOGY, TAXONOMY)

Range Management-Wildlife Training Conference
by Floyd Kinsinger

I am not going to tell you anything new but to emphasize certain requirements for doing a good job of management. Those of you who have studie a curriculum of range management have had all this material before. Perhaps we can refresh your memory, point out the importance of a good understanding of certain basic principles, and stimulate some thought and discussion.

The agenda committee has given me a few minutes to try to accomplish these objectives through a discussion of ecologic, physiologic, and taxonomic principles.

First, a word about taxonomy. Taxonomy is the classification of plants, standardized throughout the world by the use of scientific names. BLM has a manual release (4-8) 4411.31 (Plant Symbols and Names) which lists some of the common plants (grasses, grasslike plants, forbs, shrubs, and trees) found on BLM administered lands including the scientific name, common name, family, and 4-letter symbol. In addition, this manual contains a list of plants poisonous to livestock, the toxic principle, and the kind of stock affected.

Probably the most significant statement I will make during this conference is this: You cannot know <u>how</u> to manage a range unless you know <u>what</u> you are managing. A basic fundamental for management is the identification of range plant species. It is also important of course to have knowledge of requirements for growth, life history, periods and degrees of use, and class of livestock to which a particular range is best suited. Suppose I mention some plants to you: <u>Agropyron Cristatum</u> (crested wheatgrass), <u>Sitanion hystrix</u> (squirreltail), or <u>Purshia tridentata</u> (bitterbrush)? Immediately, these plants mean something to you. You can recognize and identify them when you see them; you know something about their growth requirements, season of use, how much use, nutritive value, their reaction to grazing, and the kind of livestock to which each is best suited.

But suppose I say <u>Brachiaria dura</u>? Do you know the plant? Could you recognize it? Can you design a management system for it? This grass plant grows in Barotseland, Zambia, Central East Africa. Even if you knew all about its growth and physiology from reading the literature, you could not plan for its use until you recognized it.

Another example: I had occasion to meet in the field with a number of ranchers, discussing various management problems. One of them asked, and others joined with him, how and what to do to get rid of the "weeds" in his pastures, and he indicated three or four species of scattered forbs and semi-woody plants. The "weeds" he wanted to eliminate were some of his most valuable nutritious plants. He did not know the plants or anything about them.

Poisonous plants, unless recognized and guarded against, may menance the welfare of livestock. A little boy in the east died not long ago from eating hemlock. He did not recognize the plant.

The range manager must be more than a taxonomist -- the recognition of plants is a relatively simple job. The range manager must know more about the plant than just its name -- your job is more difficult.

What is this additional knowledge you must have? The definition of range management most commonly used states that it is a "science and art." In many respects management is also a science and art. The "science" is a body of knowledge of the basic principles concerning the resources with which we work -- vegetation, soil, animals -- and includes several fields. Some of the most important disciplines (in addition to taxonomy) are ecology and physiology. The "art" of range management is the application of these principles to grazing land (or wildlife habitat) management. The range manager and the wildlife manager both manipulate the vegetative resources through the use of grazing animals and by artificially modifying the habitat.

Ecology is the study of the relationship between organisms and their environment. The organisms we are dealing with are primarily grazing animals and man and the environment is rangeland on which we work. This environment is actually composed of many different combinations of environmental factors such as temperature, light, moisture, soil type. Each combination is desirable for specific organisms -- each is a "system" of dynamic forces. So we work with a lot of ecological systems in range management -- each composed of a combination of climatic, edaphic, and biotic factors acting on each other and reacting. Ecosystems can be very small or very large. The most common unit of range land that may be considered an ecosystem is the range site. This is an area having a combination of soil, climate, and topography resulting in vegetation that is favorable for certain animals -- they are significantly different from other areas. Each allotment or grazing use area is a group of ecocystems. The rangeland ecosystem is modified by mans' activities -- the kind and number of livestock, control of predators or noxious plants, land treatment, and control of fire or lack of it.

In a sense, the concept of key area is an ecosystem. This is a combination of conditions and influences of use by organisms that provides a sampling area. The ecological and physiological reactions such as trend, reproduction, etc., of the organisms (vegetation) as a result of grazing by other organisms on the key area is indicative of the ecosystem as a whole (the allotment).

Plant physiology is the study of how plants function and of the processes involved in their growth and behavior. Ecology and physiology are so naturally influential on each other that it is difficult to discuss the two disciplines separately. The mere fact that a plant grows modifies the environment and changes conditions in the ecosystem. Growth provides more shade and protection for the soil thereby influencing temperature and moisture relations; the growth of roots adds organic matter but removes moisture and minerals.

By the same token removing the plant, either wholly or in part, modifies the environment as well as the physiology of the plant. By simply opening the gate and permitting a cow on the range has modified the environment -- we have added another organism to the environment. The cow in turn, by her grazing habits, has an effect on the physiology of the vegetation.

What are the ecological and physiological effects of grazing on the range? Removal of photosynthetic tissue primarily affects production, root growth, reproduction, and carbohydrate storage. Continued frequent and intense herbage removal may result in death of the plant. Production decreases, root growth stops, limiting the volume of soil from which nutrients and moisture are absorbed; reproduction is inhibited; and storage of reserve forbs is exhausted.

Because of these physiological responses of the plant, it is less able to compete with other plants, and the environment becomes more suitable for ecological change (succession).

These interacting principles of ecology and physiology require that the manager be fully aware of the complex forces he is dealing with when making range readiness studies and designing management systems. The successful manager will manipulate the environment so that both the plant and the animal are provided with a favorable habitat.

4412 - PHYSICAL RESOURCE STUDIES
BASIC CONSIDERATIONS - Tom Heller
Joe Townsend

.2 Range Studies. Each study is a tool to be used by the resource manager to assist him in obtaining good range management. For maximum effectiveness studies must be employed in combination with each other. The emphasis placed on any one study will depend entirely upon the characteristics of the particular problem being considered; therefore, studies should be conducted when determined that they are needed to accomplish specific objectives. When the objectives have been determined the particular studies needed to achieve them can be selected.

.21 Basic Considerations. Manpower and budget ceilings limit the time and personnel available for range studies. We cannot take a sufficient number of samples on large areas to achieve statistical precision; therefore, the Bureau will use a key area concept in all of its range studies. The BLM range studies were selected because they are technically sound, simple, rapid, and easy to apply. Following are the basic factors to be considered before undertaking range studies.

A. Coordination. Range studies should be closely coordinated with all other facets of multiple use management to prevent duplication and to make certain that there is a free flow of information between the resource programs. Data from range studies will be used primarily in evaluating the effectiveness of grazing systems but will also be useful for integration with other resource data into the unit plan.

B. Priorities. Priorities for management plans will generally be based on lands classified for long-term multiple use (Types I, II, and III). Within this framework range studies should have the following priorities:

a. Areas presently under intensive management (areas with a satisfactory grazing system documented in an allotment management plan).

b. Areas where intensive management is being planned; this will include areas where there have been, or will be, heavy investments of rehabilitation funds.

c. Problem areas and areas that may become problems.

d. Remaining administrative areas.

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C. Key Areas. A key area may be defined as: A portion of range which, because of its location, grazing value, and/or use, serves as an indicative sample of range conditions and trends. Key areas may also be considered as the "pulse" of the range. Key areas guide the general management of the entire area of which they are a part and, if properly used, the maintenance of satisfactory conditions on the range as a whole is assured.

1. Site Selection for Key Area. It is mandatory that careful consideration be given to selection of key areas for all range studies. The fundamental objective of range studies is to determine what is actually happening to the range resource. Poor data as a result of improper selection of key areas can result in poor decisions and poor management. A key or indicator area will normally be a significant unit of rangeland. It may be located on an area used by livestock or wildlife, or on a critical watershed. Its proper location is extremely important. Key areas should be identified and located by qualified professional people who are thoroughly familiar with the areas of use and management objectives. A key area may change with management, range conditions, class of stock, or for other reasons. Western ranges are seldom utilized uniformly; thus, every range presents a different grazing management problem. Knowledge of livestock and wildlife grazing habits, and plant growth habits can help determine key or indicator areas. Portions of the range near water, salt, and easy access are certain to have heavy use; conversely, sites remote from water, inaccessible, etc., will receive light use. A key area should have one or more of the following characteristics:

a. It should be representative of a large proportion of the suitable seasonal range area or have important grazing value on a small area; i.e., mountain meadow, etc.

b. It should be grazed each year that the range is used. (Key areas may also be required on frail lands, inaccessible areas, etc., for purposes other than grazing.)

c. It should be capable of showing trend.

d. It should be worthy of conserving in order to fulfill such objectives as protecting a watershed, maintaining a biotic community, or producing forage and/or habitat requirements for livestock and wildlife.

4412 - PHYSICAL RESOURCE STUDIES

2. Stratification. The range technician must stratify the allotment or pasture into areas having similar characteristics. These may be areas having similar vegetation, comparable soils, uniform topography, similar grazing use, etc. Stratification is a means whereby the allotment is divided into strata having similar characteristics and features. If the allotment is divided into pastures or units, each pasture will contain a key area on each stratum.

a. Strata to Consider in Location of Key Areas.

(1) Vegetation. The primary criterion to consider in the location of key areas is the vegetation. Within an allotment, or pasture, vegetative types in varying stages of ecological succession (range condition) will exist. A key area will be located on each broad vegetative type which contributes significantly to the grazing capacity. EXAMPLE: Suppose an allotment is composed primarily of pinyon-juniper, sagebrush-grass, and shadscale types. Key areas should be located in each type so that a typical representative sample of the stratum can be obtained. This will require careful on-the-ground observation.

(2) Soils and Topography. Gross soil and topographic environmental differences are ordinarily expressed in the vegetation. This is the reason why vegetation is the most important strata to identify. However, soils and topography are important and must be considered on frail lands, crucial areas, and on areas that have been repeatedly burned or are heavily eroded.

b. Minimum Size of Stratum for Sampling. Stratum consisting of less than 10 percent of the allotment size will not be considered for the location of key areas unless the stratum supports a major portion of the livestock grazing, FOR EXAMPLE: A highly productive meadow. As an illustration, assume an allotment of 10,000 acres on which 4 general vegetative types (strata) have been recognized: sagebrush-grass, 40 percent of the area; greasewood, 8 percent; shadscale, 2 percent; and pinyon-juniper, 30 percent. Using the minimum size of sampling area of 10 percent of the allotment, it would not be necessary to locate a key area in the greasewood. However, if the greasewood had been wet meadow consisting of 800 acres (8% of the allotment) and was used for grazing and not for haying, it would be sampled as a key area because the meadow produces (or has the potential to produce) the bulk of the forage on the allotment.

3. Location of Key Areas Within the Stratum. Studies will be located on key areas within each stratum. Although the allotment or use area is stratified into relatively homogeneous strata, considerable variation exists within the stratum because of livestock distribution and grazing habits resulting in different range condition classes. on very large areas (over 5,000 acres) it may be desirable to establish more than one key area. However, it is important to understand that the number of needed key areas is a function of variation and not of size. On ranges managed under a year-long or season-long continuous grazing system, an area of intermediate use (midway between heavy and light) should be chosen as the key area. Ranges under a noncontinuous type grazing system (rest or deferred rotation, etc.) may require that the key area be located on an area of livestock concentration: a valley bottom, a meadow, etc. However, it may be desirable to have additional studies on depleted areas that have potential to respond to management and also on ranges in good condition. Dramatic changes in vegetation can be demonstrated on depleted areas, if potential exists, by changes in management. FOR EXAMPLE: Studies located near water may show rapid improvement if management is changed to include deferment, rest rotation, or better distribution. Such studies may be necessary, occasionally, to obtain convincing proof of the benefits of management. However, except in unusual circumstances, studies will not be located near water or salt grounds; in close proximity to fences, gates, trails, or roads; or in other locations where livestock tend to congregate or travel excessively. It must be remembered that the primary objective of studies is to assess the adequacy of management. Most studies, therefore, will be located on key areas on the assumption that these are the areas representing the site; whatever occurs on "key areas" is assumed to occur also in the stratum as a whole. The key or indicator areas should be fully described and outlined on the allotment or pasture map.

D. Key Species. A key or indicator species is defined as one that is relatively or potentially abundant; one that endures moderately close grazing; and one that serves as an indicator of the changes that may occur in the vegetational complex. The key species should represent a forage source that, if overused, will cause a significant change in watershed values, animal grazing capacity, or other management objectives. Proper grazing of the most important forage plants, on key areas, means correct grazing for the entire allotment or pasture.

4412 - PHYSICAL RESOURCE STUDIES

1. Determination of Key Species. A key species should be abundant on a range in good or excellent condition, and potentially so on a range in poor condition. On depleted ranges the plants being considered for key species may be so scarce that they are found only on protected sites. When this is true, the resource manager must determine whether the greatest benefit can be obtained by protecting or sacrificing these species. If the species are the best plants for the area and their restoration is feasible, then management should be based on increasing these key species until they are a major component of the plant community. The achievement of this goal may involve a severe change in management and use restrictions. During the restoration period, utilization studies should also be conducted on other species that comprise the bulk of the forage. Under these conditions the species on which management is based may be termed the key management species and the species chosen to determine utilization as the key utilization species. The resource manager should bear in mind that grazing values may be of secondary importance. As an example, watershed protection may require the selection of plants that protect the watershed but are not the best forage species.

2. Proper Use. Proper use of a forage plant is dependent upon the grazing system, management objectives, plant association, the site condition, and whether the plant is grazed during the growing period, after maturity, or both. Therefore, moderate utilization does not always indicate proper use. The plant must have sufficient photosynthetic tissue to support its physiological requirements, to provide for optimum root development, and to furnish an adequate supply of nutrients to carry it over periods of stress. There is no exact degree of tolerance for a specific percentage of herbage removal that can be attached to a plant species unless the application is confined to specific areas and time of use. When it becomes evident that the management objectives are not being reached, then a change in management is needed.

E. Crucial Areas. A crucial area may be defined as a portion of range which requires special management to protect, maintain, or improve vegetation, soil conditions, esthetic values, wildlife habitat, etc. These areas may be crucial because other multiple use values make it mandatory that grazing use be limited. Crucial areas must be identified and special consideration given for their management.

1. Identification of Crucial Areas. A crucial or problem area will normally be a significant unit of rangeland of extreme importance for a specific reason. Probably the two most important types of crucial areas are those identified for wildlife and watershed values.

a. Wildlife Crucial Areas. Within the general winter range, there may be rather definitely defined smaller areas to which game animals are confined during periods of heaviest snow cover. When these conditions occur frequently over extended periods, the capacity of this "crucial" area will be the limiting factor on the size of the game herd that can be maintained. Crucial areas may also be identified to protect "breeding grounds" for certain upland game species, or for nesting areas, kidding grounds, fisheries habitat, etc.

b. Watershed Crucial Areas. These are areas where erosion is severe, or potentially so, and where special problems exist in securing soil stability. On these areas one of the primary objectives will be to secure soil stability through vegetative cover. An excellent example of these deteriorated areas are the "Frail Watershed Lands" which have been identified for specific Bureau attention. Also to be considered are watersheds furnishing water supplies for communities, etc.

c. Other Crucial Areas. Additional areas may also be identified as crucial areas for either short or long term consideration. Such areas may include reforestation sites and intensive recreation areas such as may occur along stream and lakeshores.

2. Identification of Key Areas. If the range has been properly stratified the crucial area will be one of the stratum. Key areas will be located on these sites as required, in the same manner as previously described under 4412.21C1, Site Selection for Key Areas. Many of these areas will not be fenced and it may be important to determine the impact of livestock grazing on the values for which the critical area was identified.

F. Range Readiness. Range readiness may be defined as the stage of plant growth or soil condition at which grazing may begin without permanent damage to the vegetation or soil. The type of grazing system is an important factor and may place different emphasis on range readiness. Range readiness, from the physiological viewpoint, is the plant growth stage when sufficient photosynthetic tissue is present to allow the plant to manufacture most of its own food without drawing on its reserves.

4412 - PHYSICAL RESOURCE STUDIES

1. Basic Considerations. Because of differences in elevation, slope, exposures, and forage types, there is often a great variation in the date on which forage is ready for grazing on different parts of the range or the same allotment. Marked variation also occurs in the rate of growth and development of plants from year to year. Such variations are greater in the lower elevation zones. Temperature influence is evident during all stages of range plant development and appears to be more important than other factors in determining rate of growth.

a. Plant Growth and Development. Perennial grasses are usually more dependable as forage producers, are often superior in nutritive value, and generally provide better watershed protection. Therefore, the initiation of grazing use should be governed by the growth and development of the important palatable forage species (key species). Where it is not practical to vary the opening date each year, it is necessary to establish grazing dates sufficiently late to prevent damage to the vegetation during subnormal years.

b. Management. It is important to manage livestock so that vegetation can be cropped with a minimum of injury. Where possible, the soil should be adequately dry to avoid damage from trampling. Such management may be accomplished by dividing the allotment or unit into seasonal zones or management units, determining the average date when each is ready for grazing, and scheduling use so that the range is grazed when the desired stage of plant growth and soil conditions has been attained.

c. Grazing Use. Heavy grazing is especially detrimental when it does not allow for regrowth after the grazing period. Spring grazing is generally the most difficult to fit into a grazing system. Spring ranges are not ready to graze when animals must leave the winter areas because the winter ranges are at lower elevation and plant growth begins earlier than on spring ranges. This poses the problem of late-winter and early-spring grazing which may be alleviated, depending upon the area, by crested wheatgrass pastures or rotational use of native range. Proper range readiness requires adequate control and seasonal distribution of livestock to insure that grazing use corresponds with the proper development of the forage plants within the elevation and vegetation zones.

2. Guides to Range Readiness. Each individual plant species has its own peculiar rate of growth and development which necessitates the selection of key forage species to use as indicators of range readiness on each range area.

a. Grasses. For optimum range readiness the key forage grasses should be 5 to 6 inches in height. Early maturing grasses, not necessarily key species, such as Junegrass (Koeleria cristata), Fendler and Sandberg bluegrass (Poa fenderliana and Poa secunda), and cheatgrass (Bromus tectorum) usually will have produced flower heads by the time stock should go on the range. Later maturing grasses, such as the wheatgrasses, may not have shown any flower heads but forage will be 5 to 6 inches in height. Special cases exist where certain grasses can be grazed at different seasons. Many southwestern range areas contain tobosa (Hilaria mutica), and black grama (Bouteloua eriopoda), within the same area. If possible, the tobosa should be grazed during the growing season when it is palatable and the black grama, which is palatable throught the year, reserved for fall-winter use. On California annual ranges, the grasses in late winter should average 2 to 3 inches in height before grazing. Slender oat grass (Avena barbata) may be 6 inches or taller at this period; filaree (Erodium cicutarium) should be 1.5 to 2 inches.

b. Browse. Where a large portion of the forage is made up of browse, these plants should be closely observed and grazing should not begin until the leaves are one-half to three-quarters developed. Serviceberry, bitterbrush, chokecherry and deerbrush will have started blossoming.

c. Soil. An additional indicator is the firmness of the soil; where possible spring use should be delayed until the soil is dry enough to prevent trampling by livestock. In some grazing systems, spring grazing may be necessary before the soil has reached this stage.

d. Elevation. In areas with variations in elevation, it is generally accepted that range readiness is delayed 10 to 14 days for each 1,000 foot increase in elevation. Also, a given stage of vegetation development is about 4 days later as one progresses northward 1 degree of latitude. Northern exposures, heavy brush areas, aspen areas, and timber areas may require an additional period of deferment.

G. Record Keeping and Filing. Documentation of records, reports, etc., for range studies is essential for reference to ascertain progress, to maintain historical accounts of conditions, to provide comparison with similar situations, for orientation of new personnel, and other reasons. Some logical and practical system of filing the data for ready retrieval is imperative or the records lose their significance and make little contribution to management.

1. Record Keeping. All records and forms required to conduct range studies and allotment evaluations will be prepared in accordance with procedures set forth in BLM Manual 4412.2 and 4413.

2. Filing. Range studies, evaluation of data, and grazing management plans developed from the evaluation are all intimately interrelated. It is extremely desirable that this material be filed chronologically in one location for ready reference, even though it may mean duplication of some records in other files. The primary purpose of this section is to make certain that all facts relating to range management on a particular piece of land are maintained in a central file. A file will be established on each allotment or use area. It is improbable that all studies listed in BLM Manual 4412 will be conducted on each allotment; however, the data collected will be filed in the following sequence:

I. Resource Management Area.

A. Planning Unit.

1. Allotment (or use area).

a. Maps and overlays - generally work maps. (Do not duplicate overlays contained in the unit plan.)
b. Resource inventories
(1) Forage surveys
(2) Soil investigations.
(3) Range suitability.
c. Adjudication data - unit summary sheet, etc.
d. Range studies.
(1) Actual use.
(2) Utilization.
(3) Trend.
(4) Climate analysis.
(5) Exclosures.
(6) Production - current and potential.
(7) Condition.
e. Allotment evaluation. (Brief concise written report including summarization of studies data (Form 4413-1), alternative plans to achieve management goals, recommendations, etc.)
f. Copy of approved management plan. (This will include the selected grazing system.)

Chris Vossler

ACTUAL USE

The new Manual on Range Studies 4412.2 has been broken down into three parts: 4412.21 - Basic Considerations, which were discussed yesterday; 4412.22 - Primary Study Methods; and 4412.23 - Supplementary Study Methods.

Primary Study Methods. The minimum range studies and their evaluation necessitate the collection of data from four separate studies: actual use, utilization, trend, and climate. Data from these studies must be considered and evaluated simultaneously because of their inter-relationships. Usually no one method can be effectively applied independently of the others.

Supplementary Study Methods. Additional data may be required to provide supplementary information on which to base sound management. Supplementary information may include forage production, study exclosures, and condition studies. Local conditions will indicate to the resource manager which of these supplementary studies will be required to properly evaluate range allotments and management plans. These studies should not be overlooked as tools in the evaluation of the resources and should be used where applicable.

The basic part of this discussion is to be on Actual Use. The definition of Actual Use which will be used by the Bureau is: "The grazing use made of an area by livestock and/or wildlife without reference to permitted or recommended use, including all livestock whether authorized or in trespass. It is usually expressed in terms of animal unit months or animal units."

Actual use records are important whenever an allotment evaluation is conducted to provide a basis for development of grazing management plans or management goals. These records should include any or all of the following: cattle, sheep, goats, horses, elk, deer, antelope, rabbits, rodents, insects, etc.

These records can be used on subsequent evaluation for:

1. Revising;
2. Adjusting existing management plans.

Condition, production, utilization, and trend data are of limited value in management decisions unless the past grazing history is known. The reliability of licensed numbers for actual use data is questionable at best. Many times the user may not turn-out with the numbers and on the dates for which he applied.

There will be times when actual use figures will have to be an educated estimate, but every effort should be made to obtain accurate information.

The District Manager will be required to determine priorities and select the appropriate method for obtaining actual use. The priority sequence is as follows:

First - Areas under intensive management
Second - Areas where management is being planned
Third - Problem areas
Fourth - Normal use supervision

Procedures.

There are both direct and indirect procedures by which actual use can be obtained. The direct methods include personal contact, counting, marking, tagging, and others. Indirect procedures are:

(1) Operators' returns (Form 4412-8);
(2) Forest Service records (Ranger counts);
(3) Fish and Game Dept. records;
(4) Others

When it is not feasible because of funds, time, or personnel to use the direct procedures, then we should go the indirect route. The use of indirect procedures for gathering actual use data will always leave certain questions as to the reliability of the data. This will require caution and mature judgment on the part of the resource manager. Familiarity and knowledge of the operations, coupled with spot-checks, should generally be sufficient to determine the reliability of the data for allotment evaluation purposes.

Indirect Procedures -

Actual Use Questionnaires. It is anticipated that the use of this questionnaire will become one of the most widely used procedures in the Bureau for obtaining actual use information. Form 4412-8 is a self-addressed form which can be furnished the range users in areas under intensive management and where the user is aware of the need for detailed study data. This relatively self-explanatory form requires the user to fill in the dates and numbers of livestock put on or taken off the range, the allotment name, and his signature. Form 4412-8

can be attached to the annual billing notice for completion either for the past year or the ensuing year, or, it can be completed at the end of the annual grazing period. Vigorous follow-up of the questionnaire is required. Failure to return this form will be cause for refusal of subsequent grazing use by the district manager. The long and the short form Grazing Applications - Forms 4115-4 and 4115-5 - have been revised so the district manager may require actual use data to be furnished by the user. We must build an atmosphere of mutual trust and confidence between the Bureau and the users, which should result in their furnishing actual use data voluntarily. It is impossible to regulate actual use by police action. There are too many operators and units within the districts to make it feasible to be on top of each operation. Every effort should be made to educate the operator as to the importance of livestock use records and how they will benefit his operation in the long run. A district Advisory Board which is conscious of the need for actual use data can be an aid in this "education" process.

Examples:

If the operator is licensed to graze 100 head for proper use and he has 25 head in trespass, utilization checks will indicate over-use of the range, which will call for a downward adjustment in livestock. If actual use data is known, then an adjustment would not be needed--only remove thetrespass.

Also, if the operator is licensed to graze 100 head for proper use and he only grazes 75, utilization checks will indicate under-use of the range, which may call for an upward adjustment in livestock. If actual use data is known, then the resource manager would not allow an increase in numbers.

Spot-checks will be made of a portion of the users each year for verification of actual numbers of livestock on the range.

As future management plans are developed in conjunction with the range user, the plan will specify the manner in which actual data will be furnished and the rancher must sign the plan indicating that he agrees to furnish the data.

Other indirect methods are feedlot counts, dipping vat counts, shearing pen counts, and Ranger counts. These methods all give numbers of livestock, but they fail to indicate where these livestock are using the range and for what dates. In order for data from these types of counts to be useful, the resource manager must verify the time the livestock spent on public domain.

Direct Procedures -

The resource manager can generally depend upon the reliability of actual use data secured from most of the direct procedures. On problem areas, one of the direct methods for obtaining actual use will be used. Livestock numbers secured from direct procedures will be documented on Form 4113-1, Certificate of Livestock Count. I believe most of you have at least seen this form. It is an internal district form which is used in conjunction with the range-use supervision function.

1. Numerical Counting

Livestock can be counted along a fence, through a gate, or along a road, or out in the allotment. This method is justified for problem areas where major adjustments in grazing use or management are anticipated, and on rehab areas of high monetary investment, to assure proper use of the resource. It may be advisable to count a certain percentage (guide only 10-15%) of the district operators each year. This type of count should be unannounced. These unannounced counts should help to bring the actual use in accord with license use.

2. Aerial Counts.

Counts made with the use of airplanes or helicopters have limited usefulness because livestock and game animals tend to seek cover as the aircraft pass over them. Aerial counts are best suited for location of problem areas. The resource manager can pick up these problem areas with an aerial count and then apply a more refined method of obtaining actual use, if necessary.

3. Enlarged Aerial Photos

Enlarged aerial photos of grazing animals may be used for actual use data; however, the reliability of the data is reduced, and the cost of the photos may not be justifiable.

4. Dye Marking or Paint Branding

Marking of livestock is of great value for trespass control, but this can also be used to obtain livestock counts on allotments. Some basic considerations of marking are:

1. Good on common-use allotment; generally on an individual allotment, it is just as easy to count the livestock.

2. Can be seen at a considerable distance.

3. Helps eliminate trespass.

4. Should not be used at times when the hair or fiber is being shed, because the mark is only as permanent as the current growth of fiber.

5. Must be handled by a qualified person (BLM personnel). The Government is liable for tort claims if the dye is not used with caution. There has been a case when an individual collected on a tort claim because he reportedly had gotten some dye in his eye. There was a question on whether the eyes were damaged before, but the point is that he collected from the Government and, therefore, the Bureau must take every precaution to protect itself from damages. We recommend that only BLM employees use this material for marking livestock.

(Nyanzol) Black Dye is generally used for marking livestock; however, there are a number of different brands of livestock paint which are commercially available. Dr. Schoonover at the University of Wyoming published a mimeographed circular No. 38 in January 1954 which described the ingredients and mixing procedures of Nyanzol dye. The basic ingredients are:

Nyanzol D Powder
Gum Arabic
Hydrogen Peroxide

The mixture of this dye has been changed in different areas by individuals trying to obtain a longer lasting dye, or because of safety reasons. Some have increased the strength of the peroxide; some have left the peroxide out; some have added sodium sulfite in minute amounts. But the results have generally been about the same--a black mark which is readily seen on livestock. This dye does crystallize when the mixture cools.

There are several methods which are used for marking of livestock. I will discuss two which are commonly used and one that has just recently become available.

(1) First is the sponge dauber. A regular 2-inch thick household sponge is attached to a metal plate welded to a 28-inch long, 1/2-inch diameter handle. When the sponge is loaded with dye and properly applied, a highly recognizable mark is produced on livestock. Under ideal conditions where a proper chute is available, a couple hundred cows can be marked per hour. The dauber can be used under cooler weather conditions than can the spray gun.

(2) Spray gun. The spray gun I am familiar with is a modified Panama Tree marking gun. A valve stem installed on top of the tank allows for pressurization of the tank by a car pump. The air pump in the marking gun does not operate properly as a result of the heat from the dye mixture.

There is a safety measure that should be considered in the use of this gun. An accident occurred in the Forest Service two years ago, when one of the tanks exploded while being used for marking. It is believed that the peroxide used in the dye mixture generated excessive pressure in the tank. As a result of the accident, the USFS in Idaho does not use the peroxide in the mixture and they report that the mark is staying on practically as long as with the peroxide.

The mixture should be kept fairly warm during use to prevent crystalization. Crystalization occurs in the nozzle when the mixture cools to around 70°F.

(3) Pellet marking guns are available which permit the marking of livestock from a distance of up to 50 feet. These guns fire a breakable dye-filled pellet. Although unproven in BLM operations, this pellet gun may allow for easy and rapid marking of livestock with minimal handling of the animals.

(4) Tagging of livestock is best adapted for trespass control, but it also furnishes one of the better means by which actual use can be determined on allotments. Several types of tags, such as metal and plastic ear tags, are available for use. Plastic neck bands have been used by wildlife personnel to identify wildlife movement. These bands may have merits for use on livestock. There are several limitations to tagging:

(a) Time consuming
(b) Cost of equipment
(c) Requires increased personnel
(d) Requires extra handling of livestock
(e) Tags may be lost in brush-type vegetation

The extra time and effort may be justified for problem areas and on areas under intensive management. Tags can be issued to the livestock operator with his annual license, with the stipulation on the license that livestock will be tagged, and any livestock found on the range without tags would be considered in trespass. (Note: As the season progresses, some tags may become lost and the resource manager must use discretion as to the number he will allow on the range without tags.)

Both the Code of Federal Regulations and the BLM Manual give the district manager authority to require actual use data. Subpart 4113.1 of the Grazing Regulations, "Procedure for Enforcement of Rules and Regulations," states that:

> "A grazing license or permit may be suspended, reduced, or revoked, or renewal thereof denied for a clearly established violation of the terms or conditions of the license or permit, or for a violation of the act or of any of the provisions of this part, or of any approved special rule.

BLM Manual 4113.1, Procedures for Enforcement of Rules and Regulations, states:

> B. Supervision of the Range Management Activity. Supervision will be conducted to assure that the licensed or permitted use is adhered to in numbers, class of livestock, season of use, area of use, and other specifications or limitations. Where plans for salting, herding, bedding, etc., have been established, it should be determined that these requirements are being met. Supervision also requires the maintenance of actual use records (4412.22A) and utilization checks (4412.22B).

1. Livestock Counts. Counting of livestock for management purposes is a recurring activity. It is necessary to prevent trespass and to verify actual use records. All livestock counts are recorded on Form 4113-1, Certificate of Livestock Count (Illustration 26). The use of aircraft in conducting counts is of considerable assistance in areas difficult to cover by on-the-ground methods; however, in trespass cases, verification of brands is necessary from the ground unless the trespasser admits ownership. When determined desirable by the district manager, he may require that livestock be counted as they enter public lands at the beginning of the grazing season. These counts are particularly valuable on rehabilitated areas where accurate actual use records are especially important. Counts also may be made on base properties prior to turn-out on Federal range, at roundups, during branding operations, etc.

2. Authorized Numbers. There may be situations in some allotments where obtaining conformance with authorized numbers presents a problem. In these allotments, the district manager may require by stipulation on the license or permit that livestock be marked by paint branding or ear-tagging before entering Federal range. Current experience indicates that paint branding is generally more practical than ear-tagging. However, all other means should be exhausted before initiating this requirement.

Documentation. Actual use data Form 4113-1 or Form 4412-8 should be incorporated into the allotment study file, as outlined in BLM Manual 4412.21G, for use at such time as an allotment evaluation or review of the allotment plan is made.

Evaluation of Actual Use Data -

When knowledge and interpretation of actual use, condition of the range, trend of the range, and the other study data are funneled together, you can then come up with sound management decisions concerning the range.

Evaluation of actual use data only is like spotting a flying saucer. What does it mean? NOTHING!!

This training guide was established to give a uniform interpretation of actual use data. We have tried to impress upon you the need for actual use data and how they must be evaluated in conjunction with other range studies.

RANGE AND WILDLIFE TRAINING WORKSHOP

April and May - 1966

UTILIZATION - THOMAS H. HELLER

Definition

Utilization is defined as the percentage, by weight or length of browse, of the current year's growth removed by grazing animals. Utilization of a range means the degree to which animals have consumed usable forage, expressed in percentage.

A. Objectives of measuring utilization.

(1) The degree of utilization which principal forage plants can stand is limited.

(2) Maintain plant vigor.

(3) Keep an effective stand of feed on ranges in good condition.

(4) To make adjustments during the grazing season.

(5) Provide reserve food to carry the plant through drouth periods.

(6) Utilization is one of the primary considerations, along with actual use and trend, in allotment evaluation.

A determination of utilization is one of the primary considerations, along with actual use and trend, in allotment evaluation. Knowledge concerning these three criteria are absolutely essential to attain an adequate level of management. If the resource manager knows how many animals for how long have grazed the allotment (actual use), determines how much forage

they have used (utilization), and determines the effects of use on vegetation and soil (trend), he has a sound basis on which to make adjustments in livestock numbers.

Height-Weight Ratio in Grasses: In most range grasses, a very high percentage of the weight is in the base of the plant. However, weight distribution with regard to height is reasonably constant in different individuals of any species, if they are of approximately the same height.

In general, the shorter the plant as a result of differences in habitat or weather, the greater the percent of weight in the basal portion.

Since the photosynthetic tissue is mostly in the leaves, it appears more correct to base utilization on the percent removal of leaves rather than percent of the total plant consumed. This is especially important for plants whose stems produce a large quantity of the weight of the entire plant, but make small contribution to the photosynthetic activity. Maybe as much as 75% of the photosynthetic tissue is taken, but only 25% of the plant volume has been used. Animals generally always prefer leaves over stems, and this preference for leaves increases as the season advances. Under favorable conditions, grazed plants may produce more than protected plants; whereas, under arid conditions, the grazed plants ordinarily produce less than the ungrazed plants.

Factors Affecting Utilization - Management objectives, grazing systems, topography, location and distribution of water, kind of stock, season of use, effectiveness of distribution, other animals sharing forage, quality

of vegetation, and weather and climate. Animals show variable preference for different species or plant parts at different times of the year. They also show various patterns of use.

Problems of Interpreting Utilization Data - Most methods of utilization measurement require a knowledge of forage production, both in the technique and the interpretation of the results. This poses some problems in the production value needed in the utilization equation. Should the production value be:

1. Herbage production on ungrazed areas measured at the peak of the browing season.

2. Ungrazed herbage measured at the end of the grazing season.

OR 3. Total cumulative growth on a grazed range.

Disappearance Factors - Translocation of nutrients, weathering and other factors, progressively, but not always uniformly, reduces weight of herbage after the peak growth period. A study on the sandhills of eastern Colorado found that grasses reach maximum air dry weight between late June and mid-July Weight loss varies greatly by species. Total grass production dropped about 15% by September 7, and another 33% by March 18. Another study reported reduction of more than 30% of the maximum herbage weight of blue grama during the summer and fall. Additional losses occurred during the winter.

The Effects of Time and Manner of Grazing - Although a single harvesting at the end of the growing season usually produces the greatest yield, under dry range conditions, there are exceptions to this.

Time and Manner of Grazing - Periodic herbage removal from some plants in summer rainfall areas may increase total yields. Total production of cool-season grasses under drier growing conditions, however, may be reduced markedly by grazing during the growing season. The response of shrubs to browsing varies tremendously with species, time, and level of use.

Photosynthetic Tissue - The amount of photosynthetic tissue and reproductive parts that remain after grazing greatly influences the production of individual plants. Leaves contribute much more photosynthetic tissue than stems. Seeds are necessary for reproduction.

Height of Growing Points - The height of growing points and the ratio of fertile to vegetative stems is also important in determining a plant's resistance to grazing. If either a growing point or a stem bearing a seedstalk is grazed, photosynthetic material may not be replaced.

Utilization Level - An appropriate utilization level is fundamentally a physiological problem involving consideration of the plant's opportunity to fulfill the functions of root growth, carbohydrate storage, and reproduction. Repeated grazing markedly reduces root systems. Plants grazed heavily during their periods of most active growth and food storage may lack food reserves to survive. Plants must produce enough seeds to replace old plants and maintain themselves.

During the past 30 years or so, there have been many refinements of sampling techniques for measuring forage utilization, but there has been little advance

in basic methodology. Major emphasis has been on percentage removal. Whether this approach is best or its results are interpreted accurately is often questioned. Some workers have suggested that the amount of herbage that remains after grazing is a more satisfactory index to proper range use. Hyder commented that, when emphasis is placed on herbage remaining, attention is drawn to the ultimate objective, proper use standards.

Period and Frequency of Studies - Utilization studies are generally made at the close of the grazing season. When the same range is used at different periods during the year, it may be necessary to make a utilization check at the end of each grazing period. As an example, cattle may use an allotment during the spring or summer, and elk may use the same area during the winter. Utilization checks may be made at any time during the grazing season to justify stocking adjustments, to remove livestock when proper use has been attained, to adjust during periods of drouth, to determine proper division of forage when competition exists between livestock and game animals, or for other reasons.

Transect Location - The transect should be located within a representative portion of the key area. The starting point should be tied to a known reference marker and the direction of the course set by compass or a clearly-defined natural feature. This information should be documented so that future utilization studies may be conducted in the same general area. The transect should be in a straight line, if possible, and preferably across drainages in order to obtain a maximum cross-section of environmental differences.

Plot Location - Plots should be located at constant intervals along the transect. The examiner may pace or use the speedometer of a vehicle to determine distance between plots. The toe of the boot or, if using a vehicle, some point on the body of the vehicle may be used to mark plot locations. The plots do not have to be permanently located with stakes or other markers. Their interval along the transect, however, should be documented. If the key species are not present at the proper interval, then the plot should be moved to encompass the nearest plants of these species.

Plot Size - When utilization percentages are averaged from a series of observations, all plots should be of the same size. The use of a 9.6 sq. ft. plot or a multiple of this size permits a direct conversion of green or air-dry herbage yield to pounds per acre and may be useful in other studies. A circular plot containing 9.6 sq. ft. has a diameter of 42 inches; a square plot has sides measuring 37.2 inches. An 11-foot piece of 3/16 diameter round soft steel can be welded or brazed to form a 42-inch diameter hoop. A 9.3-ft. length of the same material can be bent into a three-sided open end frame which readily slips under brushy vegetation. A piece of conduit or pipe can be brazed to the center of the side opposite the open end to make a handle.

Number of Points or Plots - The actual number of observation points or plots will depend upon the patterns of use, the topography, the variability of the vegetation, and the best judgment of the examiner. Highly variable vegetation, soil, and topography require a larger number of observation points than uniform conditions.

Remarks Concerning Measurement of Trend
Presented at the
Range-Wildlife Training Conferences
at
Socorro, New Mexico; Winnemucca, Nevada; and
Rawlins, Wyoming

Trend methodology is another one of our primary study methods to determine effectiveness of our management plan. All of these methods presented so far: Actual use, utilization, and trend are "tools" to be used concurrently to evaluate our management and will provide the data needed to make adjustments in use. These three studies, along with analysis of climate, are essential and mandatory for evaluation of management. No single study will provide the proper answer for long range adjustments in grazing use.

The purpose of trend is to determine changes that occur in the forage and soil resources as a result of use. We have attempted to provide simple, reliable, and accurate procedures. The old methodology, the Parker 3-step and Deming 2-phase, were time-consuming, costly, unreliable, and provided data having little interpretive value for management decisions. Their use was terminated in February, 1965.

The new proposed method is in the second draft of preparation. It has had limited field review and testing but extensive review by the Washington Office and Service Centers. It consists of two activities confined to small permanent plots: photographs and measurement.

Trend plots will be established on key areas just as all other study plots. Selection of the key area was discussed by Tom (Heller). Plot size will be 3' x 3' or 5' x 5', depending on the amount and kind of vegetative cover. Where cover is relatively dense and composed of herbaceous species (grasses and forbs) the 3' x 3' plot will be used. When cover is sparse or composed primarily of shrubby species, the 5' x 5' plot will be used. Our proposal is to establish two plots in each key area in each stratum of an allotment or use area. Heller previously discussed the stratification of allotments, pastures, and use areas. You recall that strata were identified primarily by vegetation type but may also include soils and topography. Repeat: A minimum of two plots will be established in <u>each</u> key area of <u>each</u> stratum.

We need to discuss for a moment priorities for study purposes, time and manpower requirements. It is easy to establish plots but more difficult to record the data. The work load will become increasingly difficult as more plots are established. Remember, these are tools to

evaluate management systems so they will be established only on allotments where management is planned. So the priority allotments for study plots are the same priorities for management planning. With present manpower restrictions we can plan, manage, and study only a few allotments. And we want to stress quality of management and study, not quantity. Be particularly careful in establishing the priority allotments where management and study will be initiated.

After study plots are established on key areas, their location will be documented so they can be re-located by follow-up personnel. To aid in re-location, a steel post will be placed 100 feet due south of the plot. In some situations, it may not be possible to locate the steel stake due south. In those cases, the direction and distance from the stake to the plot must be recorded.

The plot is located permanently by means of two angle iron stakes, no less than 16" long driven into the ground at diagonal corners. Plot stakes may need to be longer where frost heaving is severe. The plot identification form (4412-16) is placed alongside the plot, the examiner positions himself so that the plot and form are visible in the viewfinder of the camera, and drives a stake (camera point) between his feet. Each subsequent photographer will stand over the camera point to take pictures of the plot. The camera point should be located on the side of the plot that will provide the best photograph.

When the 5' x 5' plot is used, a small stepladder (2-foot) is necessary to elevate the camera to sufficient height to include the plot frame and Form 4412-16 in the photo.

Photographs will consist of a plot close-up and a general view, both taken from the camera point. A 35 mm. camera fitted with 28 mm. wide angle lens, and Kodacolor film will be used. The permanent file photo will be enlarged to 5 x 7. These show sufficient detail and are not too costly. However, it may be desirable to enlarge pictures to 8 x 10 or larger to show certain features. Black and white prints or color slides can be made for special purposes such as publications or lectures. Film may be developed at any reputable dealer. Strive for quality photographs.

Using this type of camera equipment permits the photographer to stand at the very edge of the plot and aim the camera almost vertically down at the plot.

Measurements of vegetation characteristics on the plots poses more serious problems. We are interested in obtaining data concerning ground cover and species composition. Species on the plot will be listed and measured. Measurements will be used where the growth form is a bunch type and clearly defined (such as bluebunch wheatgrass, Indian ricegrass, white sage (Eurotia), etc.). For grasses, measurements will be made at

about one inch from the soil surface (basal area). Crown area will be measured on shrubs. Since plants grow in the form of an ellipse, two measurements, the long and short axis, will be recorded and the area calculated by using the ellipse formula. Annuals and single-stemmed rhizomatous species may be counted and recorded when only a few are present; or, if many are on the plot, random portions of the plot (such as every third square foot) may be counted and projected to the whole plot. If it is desirable to know the area of annuals (rather than number) or single-stemmed species, the examiner can determine the area of 10 stems (or some other unit) and multiply by the total. For example, if a plot contains 1000 stems of Western wheatgrass, and 10 stems have an area of one square inch, the area on the plot is 100 square inches.

Dead or vacant portions of a plant must be measured, calculated, and subtracted from the total area of the plant.

In many cases, the plants do not grow in clearly defined forms; instead, they are creeping, decumbent, sod-forming, etc., and difficult to measure. In these cases, a gridded frame will be placed over the plot and the number of squares occupied by specific species will be counted and recorded. It is convenient if each grid makes up a certain proportion of the plot area. For example, we have used a 5' x 5' plot with a gridded frame, each grid having an area of 0.25 percent of the plot area. If a plant occupies four of the grids, it comprises one percent of the plot area.

This method was recently field tested at Utah State University and with little training, the eight people present recorded very similar data. The method is more rapid than measuring. However, changes in plant size may not be as readily detectable as with more precise measurement methods.

It is our present plan to permit field examiners to use either method. However, the method of recording vegetation cannot be changed after the study of trend has begun.

We will draft the specifications for plot frames and grids and ask for bids to construct them. They will be furnished each district when completed to assure uniformity.

Photographs and plot measurements will be taken at approximately the same time of the year, regardless of grazing treatment. For example, in a 5-pasture rest rotation system, having five grazing treatments, photos and measurements will be taken in each pasture at the same time of the year. The pasture that is grazed heavily one year will go through the four other treatments of rest, fall grazing to plant seed, rest for seedlings, etc., before the heavy grazing treatment is

applied again. So a comparable photograph of the heavy grazing will not be available again for five years. But by then, if management is achieving results, significant changes should be evident (such as size, number of seedlings, litter, etc.).

Normally, pictures and measurements will be taken after the grazing season. However, certain plant communities may require that pictures and measurements be recorded at a different time in the grazing cycle. For example, on desert winter ranges, photos and measurement should be conducted after the summer growing period of the plants (anywhere from about July to October). If measurements were taken after the grazing period (in about April), the plants have not gone through the spring and early summer growth and will not express their vigor. By measuring in April, we will be measuring the effects of grazing the previous year. On desert shrubs such as white sage, measuring in April after grazing would give entirely different data than measuring in August or September after growth.

On year-round SW ranges, measurements and photos should be taken prior to the summer rains. Otherwise, the rapid growth after rains would be an expression of the climate and give an erroneous impression of trend.

Other situations may occur when the time for recording trend data must be carefully considered.

It will probably be advantageous to take photographs each year in a new management plan. However, trend changes are so slow, except if management or climate change drastically, that measurement is not necessary each year. A minimum of three years is sufficient under normal conditions for re-measurement of a plot. After the management plan has been in operation for several years and the stocking level, season of use, utilization, etc., have been adjusted to achieve the plan objectives, it may not be necessary to photograph or measure as frequently as when the plan was new. In special problem areas, it will be desirable to record trend data more frequently. The time of year and frequency of recording trend data will depend on the situation and the best judgment of the land manager.

The trend manual is at this time (August '66) in the third draft. It is hoped we will have it ready for release by October 1. In the meantime, allotments can be stratified, key areas and key species selected, actual use data collected and trend plots established.

STUDY EXCLOSURES

RANGE MANAGEMENT-WILDLIFE TRAINING CONFERENCE

Don Pendleton

Exclosures can be a very valuable tool for use in the field of resource management. They can be very effective in helping us evaluate our present management practices and in forcasting results of practices we may plan for the future. They are also effective as demonstration or "show me" areas to help "sell" our management and development programs to the stockman and to the public in general. Exclosures can help us prove what we think we know already, and conversely, they can also disprove what we think we know.

What is an exclosure? For our purposes, it has been defined as an area of land usually enclosed by a fence to exclude all or a specific class of animal. I say usually enclosed by a fence because in some instances relict areas can be, for all practical purposes, classed as exclosures.

The Bureau has many exclosures scattered around, and most of them fit the definition because they exclude all or a specific class of animal. And that's all they do -- just exclude animals. So perhaps we should add to the definition a little bit and say they should exclude animals for a specific purpose or for a number of purposes.

I don't mean to say that a lot of our exclosures were built without a purpose. There must have been a purpose. But where can we go or how can we find out what the purpose was? Has the exclosure served its purpose? Is it still serving a purpose? Can it serve a purpose? Speaking generally, I think our past record keeping practices leave much to be desired.

Exclosures are established for studying effects on the vegetation and soil from:

(1) Grazing management manipulations

   a. Grazing use compared to nonuse

   b. Livestock use compared to big game use

   c. Big game use

(2) Site treatment practices

(3) Rodent and insect activity

(4) Combinations of above

(5) Complete protection from use

Without exclosures or relict areas, it would be difficult if not impossible to measure and evaluate the significance of change in vegetation and soil as a result of man's activities. Exclosures permit the study of undisturbed plant succession and demonstrate the type and amount of vegetation a site will support when free from interference by all animals or a specific class of animal. Exclosures provide a means to measure and evaluate the changes occurring in vegetation and soils due to biotic influences. Permanently fenced exclosures are not considered sampling units but are controlled areas where biotic factors can be measured, recorded and evaluated on one or more sampling plots within the exclosure. These can then be compared with plots in adjacent uncontrolled areas. Exclosures fall into four general categories.

(1) Protected exclosures which exclude all domestic livestock, big game and sometimes rodents.

(2) Partial exclosures which allow certain species or classes of animal to enter while others are excluded.

(3) Grazed exclosures which enclose a certain number of animals for a period of time while all others are excluded.

(4) Small portable exclosures (cages) for studying forage yield, determining utilization and other purposes. These portable cages are considered as sampling units.

The purpose and objectives for establishment of each exclosure should be well documented as part of the exclosure record. In some states the experiment station at the State Universities, State Fish and Game Departments, Bureau of Sport Fisheries and Wildlife, or other agencies are cooperating with the BLM in conducting exclosure studies. This type of cooperation should be encouraged. A formal agreement specifying purpose, objectives, type of study, etc., should be drawn up. This will assure full use of exclosure studies, provide for adequate evaluation and eliminate duplication of efforts.

Each district will have different requirements for the number and type of exclosures called for. The district manager must decide and program for where exclosures will be helpful and the number needed to provide information that will be useful in making range management and rehabilitation planning decisions. The location chosen should be an area of uniform vegetation and soil conditions. A grazed or treated area similar to the area enclosed and adjacent to or near the exclosure will be needed for comparison purposes. This should be as nearly identical to the enclosed area as possible.

Both the enclosed area and the adjoining grazed or treated area must contain the key species of the forage type. The location should be representative of the type with respect to grazing capacity, range

condition, soil, slope, elevation, and plant composition. Seriously overgrazed, badly eroded sites, repeated burns or under-utilized portions of the range should be avoided unless special study requirements indicate otherwise. It might even be desirable in certain instances to establish an exclosure in each major range forage type.

Another consideration in the placement or location of exclosures is accessibility. If possible, a number of them should be accessible by car because of demonstration or "show me" values. This, of course, is not a primary consideration, but will apply only if proper conditions or circumstances permit.

All exclosures should be identified in the field by adequate informational signs. The sign should briefly describe the purpose, the date constructed, and should list the study cooperators.

When deciding on a district exclosure system, probably the first step will be to take a look at what we already have and see how well they fit the needs.

If an existing exclosure is properly located but is too small, it can be included within a larger new exclosure. The identity of the old exclosure should be preserved by leaving corner posts of the old fence. Any existing photos or records should be identified and retained as a part of the studies information on the new exclosure.

When an exclosure becomes obsolete or is clearly of no further value for management, studies, or research purposes, the fence should be removed and the project abandoned.

The size and shape of the exclosure should be determined by topography, vegetative types, and nature of the studies to be carried out. Small or poorly located exclosures give false impressions of condition making evaluation of results somewhat questionable, if not completely worthless. A <u>minimum</u> of one acre is necessary to afford a suitable index to normal conditions. The environment of a smaller area is usually influenced by: the fence catching tumbleweeds, snow drifts, wind movements, etc. Where the fence will have a modifying effect on natural conditions, larger areas are necessary to get normal conditions within the exclosure. When more than one vegetative type or subtype is to be enclosed, larger areas should also be considered.

The shape of the exclosure should be such that the enclosed area will be least affected by the presence of the fence. In a single vegetative type, a square exclosure will usually be most efficient because a greater area per unit of fence is enclosed. If more than one vegetative type or soil type is to be enclosed, an oblong shape with the

sides of exclosure crossing the type line is preferred. Oblong shape may be desirable also to eliminate modifying effects as much as possible on the leeward side of the fence.

The type of material and construction used for exclosures will depend upon the class of animal to be excluded or controlled. The height of the barrier may range from eight feet to exclude big game animals to a height of three to six feet to exclude domestic livestock.

Big game and sheep exclosures should be constructed using woven wire (3 or 4 inch mesh) of the appropriate height.

Cattle exclosures may be constructed of barbed wire properly spaced. Rodent and insect barriers when important and part of the study should extend below the surface of ground, the specific depth depending upon the rodent or insect habits. They should be constructed of galvanized screen.

Whenever appropriate, exclosure studies should be multi-purpose oriented.

After exclosure studies have been initiated it is very important that physical facilities be properly maintained. If fences are allowed to deteriorate, little value can be salvaged from study plots and years of study work may be lost. If the exclosure is of sturdy construction, it will assure a longer life with a minimum maintenance.

An inspection of the exclosure facilities should be made whenever studies are made at the exclosure site. Where exclosure study requirements do not provide periodic visits, regular maintenance inspection trips will be necessary to assure proper maintenance.

Exclosures provide a control for comparison of studies data (e.g. utilization, trend, present and potential production, condition, actual use, etc.) both inside and outside the exclosure. They provide a basis for evaluating vegetative and soil responses resulting from:

(1) Management manipulations

(a) Complete protection from grazing

(b) Selective grazing by one or more class of animals

(c) Selective grazing by season, intensity or system of use

(2) Land treatment practices

(a) chemical treatment

(b) mechanical treatment

(c) burning

(d) artificial seeding

(e) combination of above

(3) Rodent and insect activity

(a) complete protection from rodents and/or insects

(b) selective protection by type of rodent or insects

(c) intensity of rodent and/or insect activity

(i) surface use

(ii) burrowing

The minimum study requirements for an exclosure will depend on the purpose(s) of the exclosure. The minimum will include whatever studies are necessary to accomplish the objectives. For such studies as utilization, trend, production, condition, climate, and soil investigations, specific instructions are, or will be, outlined in manual releases. Other studies, such as those pertaining to infiltration rates, sediment production, or other special type investigations, the information to be collected and recorded will have to be worked out so as to meet the study objectives.

Exclosure study methods involve a comparison of soil and vegetative characteristics on regularly grazed ranges and areas protected, or where grazing is regulated. Studies usually require that plots be established inside and outside the exclosure. Some observations which we may want to record include:

(1) Amount and composition of plant cover

(2) Plant height (vigor)

(3) Number and size of individual plants

(4) Number of seedlings

(5) Herbage production of dominant plant species

(6) Rate of water absorption

(7) Erosion

(8) Climatic information

Photographic records are required for all exclosures. Photos will be taken as outlined in the trend manual. It is usually desirable to take initial photos, vegetation write-ups, and record soil information at the close of the first growing season after construction of the protective fences. In conducting exclosure studies, statistical analysis cannot substitute for good judgment in selecting plot sites and numbers. Seldom can all the information collected by sampling plant communities be evaluated statistically. But then practical interpretation of exclosure study data seldom requires statistical analysis for explanation, evaluation or application.

When production or utilization studies require clipping of plots within the exclosure, we should be careful not to detract from the future usefulness of the exclosure for other purposes. Clipped plots should be carefully selected, marked and mapped.

All study plots inside the exclosure should be located far enough from the fence to get away from the barrier effects. Likewise, plots outside the exclosure should be far enough away from the fence to avoid the animal trampling influence. Interpretation and evaluation of study results requires a great deal of caution. Results can be influenced by a number of single or interacting factors.

Interpretations based on large exclosures are usually more reliable than those based on smaller areas. This is due to a number of reasons; for instance, rodents tend to congregate in protected areas. Also, the barrier effects of fences are more noticeable in smaller enclosures.

The period of time since construction of the fence influences the results obtained. Exclosures established in plant communities in early stages of succession may show change within one to three years while enclosures in climax or properly grazed areas may show little difference in several decades. In sites where topsoil has been disturbed or removed by erosion it may take centuries of protection to show noticeable results.

When interpreting data, the selective habits of various classes of livestock or game animals must be considered. If a particular class of animal has grazed an area for a considerable length of time, a normal mixture of plants may not be present. In this case, restoration to the original vegetation complex cannot be expected by protection alone.

The stage of succession and growth form, whether grass, weeds, or browse, are factors which influence the rate and nature of vegetative changes when protected.

Past disturbance by fire, drainage, cultivation, burrowing by animals, insect depredation, damage by grazing animals and natural or accelerated erosion must be considered in the data interpretation.

Climate also is a factor that must be considered in the interpretation of the study data. In a series of favorable years, vegetation in exclosures may exhibit striking development as compared with that on grazed ranges.

Other factors are likely to appear when specific sites are examined.

When evaluating vegetative response to protection from grazing, consideration must be given to the consistency of the response and the magnitude of the response. Extremes may require further study.

Vegetative cover changes in most areas will be slow, but change in plant vigor should provide practical range management information in relatively short periods of time.

In essence, what all this boils down to is that exclosures can be an important tool in our management program -- but let's do something besides just build a fence. Let's plan our exclosures with a specific purpose or specific purposes in mind and then let's follow through. Let's record observations, analyze them, and make use of them.

PRODUCTION STUDIES METHODOLOGY AND PROCEDURES
RANGE MANAGEMENT-WILDLIFE TRAINING CONFERENCE

Carl P. McCrillis

The term "production" has been with us officially for several years now at least. However, we have not taken a very technical approach to production determinations, but rather a political approach. The regulations 4111.4-3 state that:

b. Base property qualifications will be adjusted to the extent that they exceed the long-term forage production potential.

c. When the district manager determines that potential is greater than current allowable capacity, he will issue a combination active use and suspended nonuse license. The regulations also cover determination of grazing capacity under 4111.3-1.

The 4110 manual makes reference to production in:

4111.31C District manager is required to estimate the forage production potential of the allotment -- difference between estimated stocking rate and potential to be held in suspended status.

.32A4a(3) Estimate the potential grazing capacity from artificial and natural means -- should represent a practical management goal, attainable within 15-25 years.

.43C District manager will issue licenses for active use at the estimated stocking rate, and for suspended nonuse for the estimated production potential. Estimated potential should correspond to what can realistically be obtained within a reasonable time (10-15 years).

How important is a determination of production and potential production? Currently, anyway, knowledge of both is necessary to properly make an adjudication of grazing privileges, and to compile a realistic range management-rehabilitation plan. The former, adjudication is now nearing completion. Range rehabilitation, speaking principally of the large scale land treatment type, is becoming more and more difficult to economically justify from purely a "production" standpoint. These philosophies, then, are diminishing in importance to BLM range programs.

What about the future? Future adjustments in grazing use will be based on studies and allotment evaluations rather than current production studies, such as range surveys. Our greatest possibilities lie in good basic range management, with such as production studies to be used supplementarily as required. We also need to closely associate potential production with watershed, wildlife, and recreational values.

Production is termed by Webster as being something produced; a product; or the rate of producing. What we are going to discuss is how we might determine what the production of a range area or site is -- how it is measured.

First, we need to define exactly what we are measuring. Are measurements going to be taken of the vegetation produced or of the forage produced? Of the amounts produced, what are they for? -- for livestock, for wildlife, or for watersheds? In this instance what we intend to do is determine the amount of forage produced for grazing animals. This quantity (production) is used to calculate the number of animals which a unit area of land can feed for a given length of time, that is, the grazing capacity.

The subject of production is generally divided into two primary categories:

(1) that dealing with current production -- production for any one year, and;

(2) that dealing with potential production or production at some future time. Potential production can be subdivided into natural and artificial. Natural potential is that which would be achieved through management of native species, and artificial potential is that which would be achieved through chemical or mechanical manipulation of vegetation.

Forage production studies are a tool of allotment evaluation, to be used in special problem situations where knowledge of production is required. What about current production? "Average", or current, production is often expressed as pounds per acre of air-dry material; it is a commonly used term and is easily understood. It is important as an estimate of grazing capacity for initial stocking of a range area, and it is important in relation to allotment evaluation, utilization and actual use studies.

Quantitative measurements, that is calculating the amount of vegetation, can be accomplished by measuring the (1) frequency, (2) number, (3) area covered, or the (4) weight. We will not be concerned today with the technical mechanics of measuring production. However, of the four approaches available, we would be primarily concerned with weight and area measurements.

This could be accomplished primarily through (1) forage surveys ((a) ocular reconnaissance and (b) weight estimate methods), and (2) clipping and weighing by (a) cages or exclosures and (b) the paired plot method (primarily a utilization study).

Annual production variation, so characteristic of the western range region, is a problem in determining current production by weight. This variation can be substantial between years. One approach to compensating for annual precipitation variations, and adjusting to "normal" production, has been developed at Squaw Butte Experiment Station in eastern Oregon. This procedure can also be used to forecast estimated production for a current year to allow for changes in stocking rates.

How important is a determination of potential production? Certainly it has had a strong effect on some of our adjudications. Where potential was not considered, or realistically apprised, we have misallocated grazing areas. This has raised problems for the Bureau, particularly in individual allotments. While potential production is much more difficult to calculate than current production, determination may have more important future implication in determining uses for natural rangelands. It is important because (1) a determination might be made of the value of natural or artificial potential in terms of increased watershed values, recreational values, animal production values, etc.; (2) determination might be made of the cost of a program in relation to the return; (3) a comparison can be made between natural and artificial approaches to improving rangeland; and (4) support can be gained from the public land user for intensive land management programs geared to natural potential. Artificial potential and development is much more widely known, but may only be accepted by all citizens to limited degrees.

Possibilities for actual determination of potential production are:

Natural

(1) Observation and experience (comparison)

(2) Range site condition-production classification

Artificial

(1) Observation and experience (comparison) on a single site

(2) Detailed planning (includes (1) above - on a grazing area:

  (a) Seedings production data

  (b) Range side classification (spraying, chaining, etc.)

Additional possibilities may derive from research now in progress, such as data from frequency sampling (University of Nevada) and resource analysis methodology (Oregon State University).

With present BLM rehabilitation experience and technical knowledge, coupled with detailed conservation planning of a grazing area, we can estimate with reasonable accuracy the potential production which can derive from treatment practices. This should be in terms of what might be done under present financing -- that is, a reasonable physical potential as contrasted to a maximum. However, such production estimates are generally limited to forage values for grazing animals. We do not know what values can be applied to watersheds, or to recreation, or to fire suppression, or to certain wildlife, or to other resources. We could also continue, into the subjects of economic justification for treatment practices, and the production influence on adjacent native rangelands resulting from treatment.

Production potential estimates can be reduced to a usable field procedure once site classifications have been defined. However, when considering natural production potential, the current condition of a site and its ability to respond to intensive grazing management, must be determined. The rate of recovery will also be dependent upon the speed at which intensive management procedures can be applied -- how much can be afforded with continued grazing.

For procedures to determine production potential for grazing animals, I would suggest as simple a technique as possible which will fill our needs. We want a figure -- capacity -- or estimate of potential production to use as a management goal. Perhaps there is the possibility of expanding existing manual procedures to provide techniques for determining production.

Chris Vossler

4413 - ALLOTMENT EVALUATION

Purposes.

The range allotment evaluation system is designed to periodically evaluate the effectiveness of management on each allotment using data which has been systematically collected through range studies or other programs. It includes a standardized and systematic basis for development of and/or adjustment in grazing management plans. Evaluation procedures are guidelines to assist in achieving more effective intensive management of rangelands, to make adjustments and regulate grazing use in order to improve the land condition.

Objectives.

The objectives of an allotment evaluation is to provide the basis for making management decisions. It should aid in determining a level of forage use by livestock which will be in balance with soil and watershed protection, wildlife, timber, recreation, and other proper uses of range resources.

Definition.

Allotment evaluation is the systematic collection and interpretation, by allotment, of existing data for use in the development of, or adjustments in, range management plans. This includes the presentation of the facts on maps, graphs, and in narrative form.

Coordination Among Activities.

Evaluation of data for grazing management purposes is one facet of the unit planning process. Certain preliminary coordination with other activities is essential to allotment evaluation and planning. Where plans have been developed for range conservation and development, timber and woodland management, wildlife and recreation inventory and analysis, lands classification, and minerals inventory, they will be utilized. However, absence of plans and inventories for other activities will not defer range evaluation. The data for each activity will be useful in developing unit plans. This does not imply that allotment evaluation will be deferred until unit planning is completed. The two processes may proceed simultaneously or allotment evaluation may precede unit planning. Data collected and compiled for unit planning can be useful for evaluation of allotments where applicable.

Priority for Evaluation

Priorities will be assigned areas for the systematic accomplishment of range allotment evaluation. The adjudication of grazing privileges must

have been completed prior to allotment evaluation. Decisions were made at the time of adjudication concerning the grazing capacity (initial stocking rate), seasons of use, potential grazing capacity (which may or may not have been determined), wildlife forage and cover requirements, and range suitability (utilization deductions). This information will form the foundation from which continuing studies will be evaluated considering the management objectives for the allotment. Some of the principal criteria to be considered in assigning priorities are:

1. Permanency of the Area for Grazing Use.

   Primary considerations will be given to those lands to be retained in public ownership and identified in the initial analysis of the program development system.

2. Acuteness of Grazing Use Problems.

   Normally, deteriorated allotments that have been or are subjected to abusive use warrant a preference for evaluation.

3. Potential Productivity of Rangelands.

   The relative ability of an area to respond to intensive management is a pertinent factor in assigning study priority.

4. Artificial Improvement.

   The extent to which an allotment has been or may be successfully developed beyond natural potentials through land treatments and structural installations may influence allotment selection for evaluation. In many instances, rehabilitation of critical areas provides the key to management of the entire allotment or use area. Artificial improvements often provide resource production beyond that which is realized from natural rehabilitation. Areas which have been rehabilitated must be evaluated and a management plan developed to protect the public investment.

5. Unsatisfactory Watershed Conditions.

   Improperly managed livestock use has often been a contributing factor to deteriorated watershed conditions. Where such conditions exist, the areas will receive high priority for evaluation and corrective management.

6. Degree of Cooperation from the User.

   Prospects for obtaining satisfactory cooperation from resource users (stockmen, sportsmen's groups, State Game Departments, etc.) in developing and maintaining a desirable management and improvement program will be considered in establishing priorities for evaluation. Deteriorated watersheds will not be assigned a low priority because of lack of cooperation.

7. Availability of Maps and Aerial Photos.

Those areas lacking suitable base maps and aerial photos and having high priority grazing problems will be assigned a high priority for map development. It is difficult to accomplish reliable evaluations without accurate plotting of studies data on maps, overlays, and photos.

Evaluation Procedures.

Range allotment evaluation procedures are designed to provide a degree of latitude in their application to different situations on public lands. Much depends on the professional judgment and wisdom of the range manager in analyzing and interpreting the data to meet specific situations and to achieve management goals and objectives. Normally, information concerning all resources, together with range studies data, is required to fully evaluate existing facts; therefore, data on all resources should be employed in combination for maximum effectiveness. An erroneous evaluation may be made if only the result of one study is used.

Summary Checklist of Allotment Evaluation Consideration

Step-by-step Sequence

A. Compilation of existing basic resource information from range studies, research findings, climatic records, resource inventories, etc.

B. Analysis and interpretation of the data to provide for:

1. Preparation of sound and practical management plans for maintenance or restoration of rangelands to a high level of sustained productivity; or the adjustment of existing management plans when necessary.

2. Coordination of livestock use with other resources.

C. Periodic re-evaluation of data collected from range studies to determine the adequacy of the existing management plan. Following are the primary and supplemental study methods which should be carefully considered in the evaluation of an allotment for grazing management.

Primary Study Methods.

Primary study methods include actual use, utilization, trend, and climate analysis. Data from these methods are the minimum required for evaluation of management effectiveness.

Evaluation of Actual Use.

Knowledge and interpretation of past use provides a basis for future management decisions. Knowledge of the use actually being made of the forage resource is the foundation for making adjustments in livestock numbers and seasons of use. Actual use data must be evaluated concurrently with utilization and trend. Actual use data also provides information useful in deriving forage requirement figures.

Evaluation of Utilization Data.

A determination of range vegetative utilization is one of the primary considerations, along with actual use and trend, in allotment evaluation. Knowledge concerning these three criteria is absolutely essential to attain an adequate level of management.

Grazing Adjustments Based on Utilization Data.

Stocking rate can be adjusted after a definite trend in the degree of utilization has been established. For example: If we have a 5-month grazing season and three years of utilization records show that the actual utilization has been 38, 30 and 36 percent, then we can make upward adjustment if there has been increased vigor, new seedlings, better composition, and more litter accumulation. But, if we have had unusually favorable weather conditions or the range is in fair or poor condition, then an upward adjustment should not be made.

Grazing Adjustment Formulas.

If trend data confirms that the range is improving, and if the range is in good condition, adjustments will be made in direct proportion to the utilization desired by this formula:

(1) Adjustments Based on a Single Key Species.

$$\frac{\text{Average Percent Utilized}}{\text{Proper Use}} = \frac{\text{Average AUM's of Use}}{\text{Proper Use}}$$

In this example, average utilization for the three years is 35 percent (assume an average of 100 AUM's of actual use). By plugging this information into the formula we come up with either increasing the stocking rate to 114 AUM's or the length of the season by .07 of a month.

$$\frac{35\% \text{ (utilized)}}{40\% \text{ (proper)}} = \frac{100 \text{ AUM's (used)}}{x \text{ AUM's (proper)}}$$

$$.35x = (.40)\ (100)$$

$$.35x = 40$$

$$x = 40/.35 = 114 \text{ AUM's proper stocking to achieve 40\% use in a 5-month grazing season}$$

$$\frac{.35\% \text{ (utilized)}}{40\% \text{ (proper)}} = \frac{5 \text{ months of use}}{x \text{ months of use (proper)}}$$

$$.35x = (.40)\ \ (5)$$

$$.35x = 2$$

$$x = 2/.35 = 5.7 \text{ months of grazing by 20 animals (114 AUM's) to achieve 40\% utilization.}$$

In order to approximate 40 percent proper use, 23 AU's may be grazed for 5 months (115 AUM's) or 20 AU's may be grazed for 5.7 months (114 AUM's). The alternative adjustment must be evaluated in terms of other resource uses. For instance, lengthening the season may permit livestock use on plant species necessary for winter game use and should not be allowed.

(2) Adjustments Based on More than One Key Species.

If two or more plants are used as key species, percent utilization and proper use must be weighted according to composition, i.e., according to the proportion of the total vegetation composed of the key species. The following illustrates the calculations necessary.

Key Species	(1) Percent Composition	(2) Proper Use	(3) Average Percent Utilization 1/	(4) Comp. x Proper Use	(5) Comp. x Utilization
A	15	50	55	7.5	8.35
B	20	60	50	12.0	10.00
C	5	40	30	2.0	1.50
D	10	40	40	4.0	4.00
Total	50			25.5	23.75

1/ Average utilization for several years.

Proper use (desired use), weighted according to composition, approximates 25.5 percent (column 4) and average weighted utilization for a period of years or 23.75 percent (column 5).

$$\frac{23.75\% \text{ (utilized)}}{25.50\% \text{ (proper use)}} = \frac{100 \text{ AUM's (used)}}{x \text{ AUM's (proper)}}$$

$$23.75x = 25.50\ (100)$$

$$23.75x = 2550$$

$$x = 2550/23.75$$

$$x = 107 \text{ AUM's stocking to achieve 25.5\% weighted proper use in a 5-month grazing season}$$

(3) Adjustments During Current Grazing Season.

Utilization estimates also serve as a valuable tool for making adjustments in numbers or length of season during the grazing season. The following example will illustrate how utilization studies can be used. For Example, assume a five-month grazing season, May 1 to September 30, and the allotment grazing capacity is 100 cows; total AUM's of use is 500. Proper use on the key species is 50 percent. A utilization study on August 1 shows that 40 percent has been utilized. The question is, how much grazing use remains and, based on the evidence, what alternatives for adjustment are available?

By putting the data into the following formula we will indicate the possible adjustments needed.

$$\frac{\text{Forage utilized}}{\text{Forage remaining}} = \frac{\text{AUM's utilized}}{\text{AUM's remaining}}$$

Substituting the above hypothetical data:

$$\frac{\text{40 percent utilized}}{\text{10 percent remaining}} = \frac{\text{300 AUM's used to August 1}}{\text{x AUM's remaining}}$$

(difference between what has been utilized and proper use)

$$.40x = (.10)\ (300)$$

$$0.4x = 30$$

$$x = 30/.4 = 75 \text{ AUM's remaining}$$

Therefore, to achieve 50 percent proper use, the 100 cows can be grazed three-fourths of a month or until about August 22 when the animals should be moved; 75 AUM's/100 AUM's = 0.75 months; or some of the animals may be removed and the remainder left to graze until the end of the grazing season.

75 AUM's remaining/2 months left in grazing season to September 30 = 37 AU's

Thirty-seven animals can remain on the allotment until September 30 but the remaining cows must be moved to another feed source. In order to make adjustments during the grazing season, the management plan should, insofar as possible, include sufficient flexibility so that animals can be moved or disposed of when feed is deficient. Conversely, it should be kept in mind that carry-over vegetation is advantageous and it is not necessary to use all the available forage every year.

Evaluation of Range Trend Data.

Trend is the result of grazing use and management under existing climatic conditions and is a means for measuring the effectiveness of management. Management not only has a significant influence on the direction of the trend, either upward or downward, but also has a marked effect on the rate of change. By improved management, the rate of range improvement may be increased. In some situations, FOR EXAMPLE, if the range is in poor or fair condition, trend is declining, and utilization is too heavy, a needed obvious change in management is mandatory. However, in other situations, with slightly improving trend and desired utilization, the needed adjustment is not so obvious.

Factors Indicating Trend.

No single factor of the vegetation or the soil can be selected as the sole guide to trend. All factors must be carefully considered and evaluated. Evidence of trend can be detected from records and photographs of change in vegetative composition and cover, vigor of key forage plants, presence or absence of seedlings, amount of litter, and current soil movement. Improving trend results from proper degree of use; therefore, every effort will be made to avoid overuse. When litter accumulates, gullies heal, vigor and reproduction improve, and cover and composition of desirable species increase, then trend is upward. The correct management of a properly utilized range in good condition will show little change in trend except as influenced by yearly climatic variations. All factors influencing trend such as climate, insect or rodent populations, repeated periodic fires, etc., must be considered and evaluated. FOR EXAMPLE, a range considered as properly utilized but showing downward trend is being influenced by some other factor, perhaps climate. In addition, the goals and objectives of grazing management must be considered.

Evaluation of Climate Data.

The basic factors to be considered are temperature and precipitation. The influence of temperature and moisture on the size of the plant is significant because of their control over growth processes. Relatively small climatic variations from year to year result in readily observable changes in plant growth. Although these changes may be temporary, they tend to influence the judgment of the non-professional in relation to range condition, range trend, and production. In other words, abnormally good growing conditions give the appearance of remarkable improvement in the range when, in fact, it is simply greater growth of the existing species. Climatic data collected by procedures set forth in BLM Manual 4412.22A4 will be summarized on Allotment Evaluation Summary, Form 4412-1 (Illustration 2). Current annual data for precipitation and temperature will be compared to average or normal conditions. When prolonged deviations from normal occur, particularly during prolonged drought periods, or during a series of abnormally good climatic years, this should be readily evident in trend and utilization data. If drought conditions prevail, adjustments in grazing management should be made to prevent permanent damage to the resource. During a series of cool, moist years, adjustments may be made depending upon range conditions and rate of change (trend). If the range is in fair or poor condition and a series of good growth years increases the rate of trend upward toward a more desirable condition, then an adjustment may not be warranted. However, if range condition is good and trend is static, additional moisture will result primarily in additional forage production which can be utilized by increasing numbers or by lengthening the season.

Supplementary Study Methods.

Additional range studies data may be necessary for evaluation under certain situations where more complete and precise evaluation of the resource is essential. The local conditions will dictate to the manager which of the studies are essential to a valid evaluation. Supplementary range studies data is provided from exclosures, production studies, and condition studies.

Evaluation of Data from Exclosures.

Exclosures are important in providing data for comparison with the adjacent treated (or grazed) area. Data collected within exclosures by primary and supplementary range studies methods will be used as a standard for comparison and evaluation with data collected from the adjacent surrounding grazed area. In this way, exclosures become another tool for studying the effects and evaluation of management on the vegetative resource. Data collected from exclosure studies in cooperation with other agencies may be useful in an allotment evaluation.

Evaluation of Production Data.

Production or yield estimates are necessary for both current grazing capacity and potential (both natural and artificial) grazing capacity. Procedures for estimating production, current and potential, will be contained in BLM Manual 4412.22B2. In evaluation of production, stocking rates can be adjusted in direct proportion to the change in usable forage production, using locally derived forage requirements per AUM. FOR EXAMPLE, If average usable forage has increased 350 pounds per acre, and the forage requirement is 700 pounds per animal unit, the stocking rate may be increased 0.5 AUM per acre. Or if average usable forage has increased 10 percent, the stocking rate may be increased 10 percent. Care must be exercised that the increased forage production is not just a reflection of 2 or 3 years of abnormally good climatic conditions, but truly reflects permanently improved vegetative condition and vigor as documented by long-term trend and utilization measurements.

Factors Affecting Production.

1. Grazing Management.

   Factors of fundamental importance in securing proper range use are balancing numbers of animals with the forage resources, grazing at the proper season of the year, and securing proper distribution of livestock over the range. The quality of management has a marked effect on stocking rate.

2. Season of Use.

An animal unit month of grazing may affect the range quite differently depending upon season of the year. The amount of grazing allowed during any season of use must be based on the physiological requirements of the plant. Grazing, in most cases, cannot be as great during plant growth as later in the season after plant maturity. Winter grazing has less effect on the physiology of the plants because production has reached a peak. Winter grazing is harmful to some plants depending upon the species involved. Browse species are generally more susceptible to damage by winter use than herbaceous plants because some of the stored foods and minerals are contained in the twigs and branches.

3. Distribution.

Improper distribution can cause localized depletion of the vegetation and soil even though over-all stocking of the allotment may be light. Many apparently overstocked ranges can be improved without reduction in use if management is adjusted to secure more uniform untilization.

4. Grazing Systems.

Evaluation of alternative grazing management systems may indicate different stocking rates, depending upon the system. Specialized systems of deferred and rotation grazing, contrasted to continuous grazing, can have a marked influence on stocking rate. FOR EXAMPLE, rest-rotation management frequently permits increased use while providing for improved range condition. Rotation grazing usually results in better livestock distribution, thus permitting more use.

5. Climate.

A close relationship exists between forage production and climate, especially precipitation and its seasonal distribution. Variable production of forage must be anticipated in the management plan. Drought damage to plants is usually increased by concurrent grazing use. Evaluation and comparison of climatic data and forage production provides an insight into proper carrying capacity and future potential of the range. The effects of climate on production can be evaluated only by comparison to relatively long-term averages. No adjustment in management can be justified on the basis of one-year's climatic data.

6. Rodents and Insects.

The importance of small mammals is probably greater than commonly believed, especially in the case of rodents and rabbits. Many of these animals consume much of the same vegetation as domestic livestock and wildlife and they do considerable damage to the range during periods of large populations.

Evaluation of Condition.

The adoption of later or shorter grazing seasons, methods to obtain better distribution, rehabilitation, implementation of grazing systems, and other applicable management practices should be considered in planning to achieve improved range condition. There is often a direct relationship between range condition, stages in ecological succession, and carrying capacity. Thus, in general, the better the condition class, the greater the proportion of desirable plants, and the higher the carrying capacity. Since the value of range depends upon the quality and quantity of forage for particular animals, a sheep range in good condition would not necessarily rate good for cattle. As a rule, maximum range condition and forage production provide maximum erosion control. Classification of rangeland into a particular condition class provides a basis from which to begin striving for the goals of management; it identifies the present situation with respect to the potential and objectives for the area; and it provides a "yardstick" for measuring the accomplishments of management. A particular condition class per se has little meaning when evaluated alone, and no recommended management changes can be made from the evaluation of range condition alone. Improving or deteriorating range condition is the result of change (trend) in composition, cover, vigor, etc., which in turn are the result of forage utilization. Range condition will be determined and evaluated periodically to assess the progress of management.

Interrelationship of Studies.

Data from range studies, particularly actual use, utilization, and trend data, must be considered and evaluated simultaneously because of their interrelationships. Trend is influenced not only by grazing use, but by variations in climate. A management decision based on evaluation of trend data alone (or data from any other single study) will be hazardous unless data from other studies are considered concurrently and compensations are made for yearly climatic fluctuations. FOR EXAMPLE, what has been the utilization and its influence on trend? How much change in the range is due to different precipitation than last year? What has been the actual use made on the allotment and its relationship to utilization? Have climatic conditions been normal and how have these influenced condition and trend? What are the basic reasons for a change in trend, if one exists? Is the direction or rate of trend satisfactory,

considering condition of the range and actual use made of the resource? Although utilization on an over-all basis is proper, is utilization uniformly distributed? If not, why?

Subsequent Evaluation.

In order to determine the adequacy of the management plan, certain range studies data will be continually collected and periodically evaluated. Certain other data will be collected as needed or when special problems arise. A continuous flow of data and its evaluation will be necessary to refine and adjust the existing grazing management plan. The management plan will be adjusted to obtain proper resource use as the facts of the followup studies and evaluation dictate. It is anticipated that an initial management plan may require considerable change and adjustment. Therefore, continuing studies and periodic re-evaluation of data is necessary to make appropriate adjustments in grazing use. Rangelands are, for the most part, a dynamic ever-changing environment resulting in the need for periodic re-evaluation. There is no prescribed interval at which allotment evaluations are conducted; however, the manager must ensure that management is proper, and studies must be planned accordingly.

Record Keeping and Filing.

All records and forms required in Allotment Evaluation will be prepared in complete detail. Form 4413-1 (Illustration 2) is provided to summarize some of the pertinent information from individual range studies needed for evaluation. This is provided to facilitate evaluation of the data and for a brief concise narration of the facts as they exist, the problems requiring solutions, and recommended or needed adjustments in management. All data will be filed as outlined in BLM Manual 4412.21G.

4413 - ALLOTMENT EVALUATION

Summary Checklist of Allotment Evaluation Considerations

1. Assemble currently available information from:
   - A. Forage surveys, adjudication files, range readiness and range suitability data.
   - B. Primary range studies (these are mandatory):
     1. Actual use
     2. Utilization
     3. Trend
     4. Climate
   - C. Supplementary range studies (to be used when necessary):
     1. Exclosure
     2. Production
        - a. Current
        - b. Potential
     3. Condition
   - D. Other resource management activities data which will influence allotment evaluation and management decisions:
     1. Water control structures, land treatment practices, and wildlife and livestock facilities.
     2. Soils
     3. Wildlife
     4. Timber management
     5. Roads and trails
     6. Mineral deposits and mining
     7. Recreation
     8. Lands status and proposed changes.

2. Prepare maps and overlays for each allotment showing the above existing information. (This is part of the unit planning process.)

3. For grazing management purposes, evaluate:
   - A. Current grazing system - numbers and kinds of animals, seasons of use, type of system, objectives of current management, etc.
   - B. Existing range studies and other data as outlined in 1A, B, C, and D above.

4. Establish needed range studies to provide a continuous flow of pertinent data for periodic re-evaluation to determine adequacy of grazing management.

5. Document allotment evaluation results and alternative management possibilities in concise report including Form 4413-1. Results from evaluation are now ready for use in modifying or revising the range management plan for the allotment, if necessary.

6622.3 - BIG GAME HABITAT STUDIES
Joe Townsend

6622.31 Introduction

A. Purpose. The purpose of this manual is to provide objectives, guidelines, requirements, procedures and methods for planning and conducting big game habitat studies on BLM administered land. Material presented applies only to herbivorous big game species and is primarily intended for use in studies of mule deer, elk, and antelope habitat. Other species are mentioned, but specific habitat studies for these will be treated in separate supplements.

B. Objective. The objective is to provide factual information necessary to plan and conduct a well coordinated big game habitat management program on BLM administered land.

C. Basic Considerations. Information needed is that which will provide a sound basis for management decisions. The resource manager needs to know the big game population requirements and the capacity of the habitat to fulfill these requirements. He must be able to identify and measure changes in the habitat and big game population, which affect any of the resources in the area. He also needs information for evaluating the effects on the big game habitat and/or population of all resource management practices and resource utilization in the area.

Key Vegetation Study Areas. A key area may be defined as: a portion of range which, because of its location, value and/or use, serves as an indicative sample of range conditions and trends. Key areas may also be considered as the "pulse" of the range. Key areas guide the general management of the entire area of which they are a part and, if properly used, assure the maintenance of satisfactory conditions on the range as a whole. Key areas will generally be selected within the general winter range, which is defined as that area available to and used by game animals through all or nearly all of the winter most years. Exceptional conditions, such as when summer range vegetation is a primary population limiting factor and/or when areas out of the winter range contain places used by big game which are crucial to other resource uses, will be treated as special situations. Within the winter range, key areas will be located to sample representative crucial areas and areas used during average and/or moderate winters. Sampling of these areas will be stratified to include all major vegetative types used by the big game species under study. Other considerations for key areas are noted in Manual release 4411.21C.

Key Plant Species. These species are those most important to the maintenance of the game herd on any specific range. They are the species available to animals during the normal season of use, which are palatable to, and actually used by them, and which are nutritionally valuable. Key species should serve as indicators of the changes that may occur in the vegetational complex. They should represent a forage source that, if overused will cause a significant change in watershed values, big game carrying capacity, or other management objectives. Proper use of these forage plants on key areas should mean proper use for the entire seasonal range involved.

D. Basic Requirements. Bureau requirements for big game habitat studies and analyses are listed below. (Informational requirements listed in 2 and 3 may be modified by the district manager in accordance with specific objectives and consequent needs.)

1. Planning. Planning is an essential requirement.

a. Planning Unit. Work described in this manual results in information necessary for unit planning. Information listed under D2, Herd Unit Description, is necessary for the resource analysis portion of unit planning. Information described under D3, Management Evaluation Studies, will provide guidelines for future development of unit planning.

b. Workplans. Before initiation, all studies must be included in a comprehensive workplan or job plan. This plan shall enumerate specific objectives, procedures, work assignments, and estimated costs and man-months requirements. (See 6621.) In addition, a work outline and checklist should be prepared and used.

c. Methods and Techniques. The State wildlife agency's methods and techniques will be used when adequate to meet informational needs. Cooperation in this respect is required of Bureau personnel. When State methods and techniques are not adequate for, or do not apply to, the Bureau's informational needs, State acceptance of Bureau methodology and studies procedures shall be solicited.

2. Herd Unit Description. The following information, as appropriate, shall be recorded on map overlays, in tabulations and in narrative reports:

a. Habitat. Information needed includes a qualitative and quantitative description of food, cover, and water for each important (limiting) seasonal use area and/or vegetational type, and a delineation of crucial areas and key area selections. If appropriate, information should include a listing of key vegetative species, with a tabulation of condition and utilization of those species within key areas.

b. Population. Information needed includes an index of actual use on key areas, late-winter age ratios for the past five-year period, starvation mortality indices, migration routes, information on animal condition, and herd estimates if available.

c. Hunter Utilization. Information needed includes hunter numbers, hunter harvest, hunter days, percent hunter success, hunter concentration areas, and access problems or needs.

d. Multiple Use Coordination. Information needed is that which will identify actual and potential conflicts of use and/or land management practices. Information should also identify actual and potential resource uses and/or land management practices which aid in maintaining or enhancing wildlife habitat.

e. Data Analysis and Reporting. A written report is needed which enumerates the objectives of the work performed; describes the work which has been done, and the methods used to do it; presents the information derived (including tabulations and map overlays), thoroughly discusses and analyzes the meaning of the information and evaluates the information in relation to other uses; and finally, makes recommendations for multiple use coordination, big game habitat management and development, etc.

3. Management Evaluation Studies. These studies are designed to provide information necessary for planning, carrying out, and evaluating big game habitat management programs as part of the ongoing coordinated land management program in the District, Resource Area, and Unit. Usually a Herd Unit Description will be necessary previous to, or concurrent with, the initiation of Management Evaluation Studies.

a. Habitat. Information needed: trend in condition and utilization of key species; overall range trend in vegetative composition, density, and vigor; and other information, such as erosion factors, vegetative production, changes in cover and water availability, as needed.

b. Population. Information needed: year-to-year trends in age and sex ratios; year-to-year trends in actual use of key areas; changes in migration patterns; and trends in animal condition.

c. Hunter Utilization. Information needed: year-to-year trends in hunter numbers, hunter days, hunter harvest, percent success, and hunter concentration areas..

d. Multiple Use Coordination. Information needed: year-to-year changes in information required under 2d above.

e. Data Analysis and Reporting. Information needed: a timely periodic report, at least annual, as described in 2e above, with emphasis on making informed recommendations on big game habitat management.

4. Filing.

a. District. Copies of plans and reports will be filed in the District office.

b. Resource Area. Plans, data, maps, and reports shall be filed in the Resource Area office. These shall be filed by herd unit within planning unit files. When a herd unit boundary encompasses more than one planning unit, the information shall be filed under the planning unit most highly involved, with cross-reference notations placed in the secondary planning unit file.

6622.32 Procedure. This section contains the approved procedures for obtaining information necessary to plan, carry out, and evaluate big game habitat management.

A. Planning. Three types of planning are involved in Bureau big game habitat management: Area planning (planning unit), program planning, and field work planning.

1. Unit planning. Area planning is based on the planning unit. Procedures necessary to obtain information for initiation of the big game habitat phase of unit planning is essentially found below under B1 (Herd Unit Description).

2. District Wildlife Program Planning. This procedure, detailed in Manual Release 6621, provides a method for the resource area manager to plan, on a job-by-job basis, a comprehensive wildlife habitat management program for his area. Procedures described below, when appropriate, will be used to attain job objectives within the resource area wildlife habitat management program.

3. Work Outline and Checklist. When planning field work, the resource manager will consider the following items:

a. Objectives. Review job objectives. Be sure they are clear and understandable. Make a list of specific informational needs.

b. Time Schedules and Deadlines. Review time schedules and deadlines. Be sure work is planned so that information derived will be available when needed.

c. Manpower and Money. Review budgets and annual work plans. Be sure manpower and money will be available to do the work. Include adequate time for data analysis and reporting.

d. Preliminary Source Investigation. Check sources given in 6622.06.

e. Wildlife Agency Cooperation. Discuss and review plans with State and, if appropriate, Federal wildlife agencies. Actively solicit their help in obtaining information and conducting studies. In several states land management and wildlife management agencies have formulated a cooperative studies procedure. This procedure should be reviewed with appropriate personnel from other agencies to ascertain applicability to BLM informational needs.

f. Methods and Techniques to be Used. Review and discuss methods and techniques with cooperating agencies. When specific methods have been decided on, assemble and review the appropriate procedural manuals and handbooks.

g. Materials and Supplies Needed. Make a list of materials needed to do the job and be sure these are available when work is initiated.

h. Technical Aid Needed. Be sure field personnel are well trained in the methods to be used. Obtain aid from the District, State Office and/or Service Center Wildlife Specialists as needed.

B. Collecting and Recording Data.

1. Herd Unit Description. This describes the work essential for providing information needed in the big game habitat segment of the resource analysis phase of unit planning procedures.

a. Herd Unit Map. The purpose of this map is to relate herd unit or management unit, as defined by State Wildlife Agencies, to seasonal ranges and Bureau planning units. Any appropriate small scale map may be used.

(1) Seasonal Range Boundaries. Delimit winter range areas when they are specifically separate from summer range.

(2) Planning Unit Boundaries. Show all planning units within the herd unit by boundary and name.

(3) Migration Routes. Indicate with arrows major migration routes or general direction of seasonal movements.

b. Planning Unit Map Overlay. These are required for the initial resource analysis phase of unit planning. Specific methods to obtain needed information are given under B2 (Management Evaluation Studies). Map symbols to be used are given under sections F, B, and A in the Standard Map Symbols Handbook (See MR 1605.)

(1) Important Seasonal Use Range. This is the range area (winter or summer) used during the adverse period. In areas where general concentrations do not occur and important seasonal use range is interspersed throughout the overall herd range area, note on the overlay the specific vegetative type and/or exposures used during adverse periods.

(2) Crucial Areas. Indicate location and acreage by vegetative type. Note why the area is considered to be crucial, i.e., elk, deer, antelope, livestock, watershed, etc.

(3) Key Areas. If key areas have been selected indicate their locations on the overlay.

(4) Migration Routes. Indicate known migration routes. If migration occurs but routes are not known, indicate general direction of migration and note the fact that specific routes are unknown.

(5) Fences. Present and proposed fences will be indicated on the range improvement and/or range management overlays. However, any fences which do or could interfere with big game movement shall be noted on the big game overlay. Indicate location of existing or proposed fence modifications specifically intended to alleviate interference with big game movement. This is particularly important in antelope areas.

(6) Public Lands Closed to Hunting. The base planning unit map contains lands status. A careful examination of this map will indicate areas where public lands may be closed to hunting. A field investigation of these areas should then be made. Any public lands which are found to be, in effect, closed to hunting, shall be indicated on the overlay.

(7) Hunter Utilization. If the recreation overlay does not show big game hunter concentration areas, note these on the big game overlay.

c. Map of Important Areas. Where immediate initiation of management evaluation studies is not contemplated, the resource manager may need a large scale map to adequately portray certain specific problem areas within the herd unit description. A basic series map of 2" to the mile may be used for this purpose. Information placed on this map will depend on the specific problems involved. See 2a (Management Evaluation Studies - Mapping) below for suggestions.

d. Vegetation Information. Unit planning requires a tabulation of the last 5 years' data on utilization and condition of key vegetation on key areas. If this information is not available, see 2b below for methodology.

e. Big Game Population Information. Tabulations of age and sex ratios and population estimates are required for unit planning. If information is not available, see 2e below for methodology.

f. Hunter Utilization Information. Unit planning requires a tabulation of hunter statistics for the last 5 years within the herd unit. If this information is not available, see 2f below for methodology.

2. Management Evaluation Studies.

a. Mapping. Use a basic series map of 2" to the mile. Use overlays as needed to properly portray information; usually a separate overlay will be needed for each species of big game animal studied. Use Map Symbols Handbook for standard symbols. Appropriate non-standard symbols and notations may be made as needed.

(1) Crucial Areas. Circumscribe crucial areas and note acreage by vegetative type. Indicate on the overlay why the area is considered crucial; i.e., deer, elk, antelope, watershed, reforestation, fire area, etc.

(a) Big Game. Preliminary identification and delineation of big game crucial areas should be made with the aid of the local State wildlife agency representative, using aerial photographs and/or topographical quadrats. A field reconnaissance must be made to verify identification and accurately locate the area boundaries. Indicators which will aid in identification and area delimitation are: high browse

lines on tall shrubs or trees, dead or dying hedged plants, normal key browse species remaining only in protected spots, poor vigor of better browse, absence of seedlings and young plants, moderate to heavy use of low value forage species, numerous game trails and tracks, abundant pellet groups, numerous carcasses, and soil instability. If necessary, crucial areas may be located by traversing at quarter mile intervals, appropriate vegetative types within a seasonal range area, and recording in a systematic quantitative manner, the above indications of excessive use. Final verification of crucial area identification must be made in the field during the first period of extremely adverse conditions following study initiation.

(b) Other. Areas crucial for other resource uses will be identified in accordance with appropriate criteria. As an example, crucial watershed areas are defined using the frail lands criteria. A thorough review of the unit plan will assist in identifying these areas.

(2) Key Areas. Select and map key areas with the aid and cooperation of the local state wildlife agency representative. Criteria for site selection have been given under the Basic Considerations section of this Manual. Be sure that sampling includes an adequate representation of crucial areas and every major important vegetative type on important seasonal range used by big game during "moderate or average" weather conditions.

(a) Study Locations. Indicate the exact location of permanent transects, plots, exclosures, etc.

(b) Key Species. Criteria for selection of key species has been set forth under the Basic Considerations section of this Manual. Indicate key species on the map overlay.

(c) Vegetative or Range Rating. If appropriate, vegetative or range ratings may be described on the vegetative map overlay.

(3) Vegetative Types. A vegetative type overlay will be necessary in most cases. In many areas this work has been done. Refer to Manual release 4412.11. Within major types, determine which are the principal staple forage species of the game animal being studied and note on overlay.

(4) Range Rehabilitation Treatment. Map existing and proposed treatments on overlay. Indicate within the treatment area, acres and type of treatment.

(5) Wildlife Habitat Improvement Projects. Map existing and proposed projects on overlay. Indicate within each area, acres and type of improvement.

(6) Occupied Sites. Indicate location of towns, ranch sites, and other dwellings on overlay.

(7) Hay and Cultivated Fields. Map these on overlay. Indicate within each the kind of crop generally grown.

(8) Water Development. Map water sources, both existing and proposed, on overlays. Indicate for each the season(s) of water availability for big game.

(9) Topographical Features. Map significant cover features of topography.

(10) Livestock Use Areas and Fences. If appropriate, prepare an overlay showing livestock allotment, class of livestock, seasons of use by pasture. Indicate existing fences or proposed fences which might interfere with big game movement. Where intensive livestock grazing systems are planned, appropriate overlay depicting the type of system, periods of use, rotation, pastures, etc. is necessary.

(11) Other Land Use. Depict on over lay, with adequate explanatory notes, any other land uses or land use proposals which do or could conflict or complement big game use of the area.

b. Primary Vegetative Studies. Vegetative studies described are those which will provide qualitative and quantitative information on utilization and condition of key plant species; plant species composition, density, vigor, and ground cover; and year-to-year trend or changes in these items.

(1) Plant Utilization. Plant utilization studies should be made each year or, if differential animal class utilization is desired, after each period or season of use.

(a) Browse. Establish at least one permanent transect for each key species. Sample each browse vegetative type within a key area. Do not cross type lines with a permanent transect. Establish separate transects in crucial areas and adjacent "moderate or average" (adverse condition) use areas. Make an extensive (nonpermanent transect) survey of each key area to provide an indicator of current utilization on the whole key area. Preferred methods are either the ones used by the State Wildlife Agency, if adequate, or Cole's Browse Condition and Utilization Survey as modified. (See appendix 1.)

(b) Grass. Use State Wildlife Agency methods on elk winter ranges, if they are adequate. The preferred Bureau methods are given in 4412.22B.

(2) Plant Condition. Methods give a measurement of vigor, utilization previous to current year, decadence and reproduction of key plant species. Year-to-year trends in plant condition enable predictions of big game carrying capacity changes.

(a) Browse. Make plant condition measurements on all permanent browse transects established for utilization. Condition measurements may also be made on extensive surveys of browse if desired. (Extensive surveys for condition are often helpful in establishing locations of crucial and/or key areas.) Preferred methods are either the ones used by the State Wildlife Agency, if adequate, or Cole's Browse Condition and Utilization Survey as modified. (See appendix 1.)

(b) Grass. On elk winter ranges where bunchgrass species are selected as key species, Cole's Key Bunchgrass Condition Survey as modified (see appendix 2) is a preferred method. On ranges where bunchgrass cannot be used as a key species consult with BLM State Office or Service Center Wildlife Specialist. In many instances, information derived from Range Trend Studies (4412.22C) will be adequate for such areas.

(3) Range Trend. Studies will be established in each significant forage type within each key area. Establish plots and associated studies in crucial areas and in adjacent "moderate or average" adverse condition use areas. These areas are those such as "moderate winter" use areas. Use methods and techniques described in 4412.22C.

(4) Exclosures. Big game exclosures have excellent long range trend values and provide valuable information for management. They can indicate site potential, rate of soil condition and vegetation improvement under several degrees of protection; provide an index of the effect of grazing by different classes of animals; compare plant species composition; and serve as demonstrations to the public. Select sites which will yield information needed to satisfy specific study objectives. Exclosure size and design, associated studies, photo plots and points, etc. must be planned to satisfy specific study objectives (see previous section on planning, .32A). Exclosure study planning must include consultation with the BLM State Office Wildlife Specialist and the State wildlife agency. Special intensive study methods may be needed. Specifications for exclosures are given in 4412.23A.

c. Secondary Vegetative Studies. (Reserved)

d. Soil Studies. Stability and condition of soil mantle shall be determined in all key areas using methods and procedures outlined in 7121.

e. Population Studies. Most State wildlife agencies have adopted methods for obtaining indices of actual use, estimates of population structure, and for determining animal condition. Since the State has the primary responsibility for wildlife management, their techniques should be accepted and such studies will be conducted cooperatively.

(1) Actual Use. This is usually difficult to determine. At best, most methods provide an estimate which can be used as an index to determine year-to-year trends for any specific area. Estimates are needed for each key area.

(a) Aerial Census. Properly conducted aerial census using trained personnel can provide good information on antelope herd population size, concentration and seasonal use areas, as well as sex and age ratio data. Elk are usually censused by air while on their winter ranges and data is used to estimate herd numbers and locate concentration areas. Aerial deer census seldom provides more than a knowledge of the location of some concentration areas. Cooperation with State wildlife agencies is mandatory. Bureau personnel will not initiate or conduct aerial game surveys without State Director approval.

(b) Ground Observation. Field reconnaissance of key areas during the adverse season should be made. Several trips will usually be necessary to obtain significant data. State Wildlife Agency cooperation is mandatory. Use their methods.

(c) Pellet Group Counts. These are usually made on key areas during the spring browse and/or grass inspections. They may be made at other times to obtain information needed to attain specific study objectives. Further instructions and methods are given in appendix 3.

(d) Forage Plant Utilization. Utilization studies, in themselves, provide an index to actual use. These have been previously described.

(2) Age and Sex Ratios. This information is usually obtained through field reconnaissance or from hunter harvest statistics. State Wildlife Agencies usually have data.

(a) Aerial Observation. Previously described under "actual use."

(b) Ground Observation. Previously described under "actual use."

(c) Hunter Harvest. These statistics are generally available from the State Wildlife Agency on a herd unit or management unit basis. The harvest is usually broken down into "Bucks, Does, Fawns," etc. These figures may or may not accurately reflect the sex and age ratio of the big game population concerned. Assisting wildlife agency personnel on checking stations, etc. to aid in obtaining this data is approved cooperation, but will only be done at their request.

(3) Big Game Migration. Information concerning migratory habits and routes of seasonal movement are usually available from the State Wildlife Agency for any particular big game herd. All migration or animal movement studies will be carried out in cooperation with the State Agency. Consultation with the BLM State Office Wildlife Specialist is necessary during planning phases. Such studies shall not be initiated without State Director approval.

(4) Animal Condition and Mortality. Studies shall be carried out only in cooperation with State Wildlife Agencies. BLM State Office Wildlife Specialist advice shall be solicited. However, BLM personnel should count carcasses when found and report their observations to the State Wildlife Agency representative.

f. Hunter Utilization Studies. These studies shall be carried out in cooperation with State Wildlife Agency personnel. See .32B2e(2)(c). Conduct studies in accordance with State methods. For special methods to determine hunter concentration areas, etc., consult Recreational Studies Manual. Notation shall always be made of access needs and problems.

g. Multiple Use Coordination Studies. Information needed may be obtained from review of District records, Unit Plans, etc. When studies are needed to identify other land uses and/or management practices, use appropriate functional studies manual procedures.

C. Data Analysis and Reporting. To be useful, information must be analyzed and reported. The following provides a general procedure for analysis and reporting.

1. Analysis of Data. Details of analysis will vary according to study objectives and work performed. The following sequence of work will usually result in a comprehensive analysis.

a. Review Job Objectives. Objectives may have been modified during the study. Check original work outline. Plan your data analysis to present results in an understandable and useful form.

b. Assemble and Tabulate Data. Check Basic Requirements for each category of data.

(1) Map Overlays. Using appropriate overlays make necessary measurements, observations, calculations and tabulations to describe data in quantitative terms.

(2) Field Data. Assemble, tabulate and summarize as needed.

(3) Other Sources. Data from records, literature, other agencies, etc. should be assembled, tabulated and summarized.

2. Report. Contents will vary according to the job objectives. However, all reports should include the following headings:

a. Objectives. Restate job objectives.

b. Procedure. State what was done and the methods and techniques used. Use sub-headings if desirable.

c. Results. Present data in tabulations, illustrations, graphs, narratives, etc. under appropriate sub-headings.

d. Discussion. Tie the data together, point out relationships, correlations, and significance of information. Indicate reliability of results etc.

e. Recommendations. Make specific enumerated recommendations as related to job objectives.

DISCUSSION OF THE COLE METHOD OF BROUSE CONDITION AND UTILIZATION SURVEYS

Richard M. Kerr

The draft contained in the proposed wildlife studies manual (6622) as drafted on April 15, 1966, was discussed. It would be redundant to list the information already printed on the draft, since this was the major discussion. Some of the various aspects that were emphasized are:

1. Availability must be determined depending on the animals concerned, snow depths and other considerations.

2. In measuring or estimating hedging, the two-year-old wood is used in the determination.

In determining leader use estimates, the percentages do not pertain to weight or volume of forage but to the number of leaders available and the number of leaders used. In other words, if ten leaders were available and five had been used to some extent, this would indicate 50% use under this system.

The draft directs the "trend interpretations are made by comparing data from different years. Changes in form and age class percentages may be analyzed by employee competence limits or chi-square tests of significant changes in average percentage leader use values by a student's T-test." It would be helpful if these various tests were given in example in the manual.

Other discussions that took place and questions that were asked:

1. Question: In establishing the brouse transects, are we attempting on subsequent readings to rate the same plants each year?

   Answer: No we are not. The transect establishes a permanent area to be estimated but not permanent plants.

2. Question: In Colorado, the brouse evaluation system used by the Game Department is different than the Cole method. What do we do about this?

   Answer: The proposed studies handbook and manual allow flexibility to use the present system being used by the Game Department in any particular state. Use their system.

3. Question: Do you establish an availability zone for each area in which you establish a transect prior to making your estimation?

Answer: Yes you do. This would vary with snow depth because of what is covered by snow and also because the snow gives additional height to the animals to reach higher on the forage plants.

Don Pendleton

RANGE SUITABILITY

Range Management-Wildlife Training Conference

Range suitability is both an interesting and controversial subject. It is certainly nothing new; we have been classifying ranges as to their suitability for grazing for years -- in one way or another

One thing we all know, and we must recognize and accept the fact, that all of our rangelands are not suitable for grazing.

We should look at each situation intently and conscientiously, and see what we're looking at. We should apply our knowledge to the situation on the ground. We must understand and use the basic principles of range management. We have to know the ecology of the area we're working in and the physiology of the plant species we're dealing with.

Range suitability scares people -- and it should <u>if</u> a standard set of limitations were developed without any flexibility -- but remember, suitability is relative -- what's suitable in one situation or circumstance may not be in another. This applies to people making the determinations as well as to the range area itself. This relates to experience and background. If a range manager doesn't think a range is smooth enough to use, you can rest assured it won't be. He won't look for ways of making use of the area by developing stock trails, clearing brush, developing or hauling water, range riding and things of this nature. What is considered as suitable range to some people may not be to others. This includes some ranchers as well as technicians, particularly when a "flatland" rancher sells out and buys another ranch in some mountainous country. It may take quite a selling job to convince him how much of the range is suitable. But perhaps very often the reverse is true.

Range suitability classification is broken down into three categories: Suitable range, potentially suitable range and unsuitable range.

<u>Suitable Range</u> - That area which is accessible to livestock, produces forage, and can be grazed on a sustained yield basis under an obtainable grazing management system without damaging watersheds or other resource values.

<u>Potentially Suitable Range</u> - These are range areas which receive little or no use at present due to deficiencies in management or improvement practices. These areas can be made accessible to livestock, have the potential to produce forage, or can be made suitable by correcting existing deficiencies. Some examples of potentially suitable range are those areas remote from water, those presently inaccessible due to natural barriers that can be overcome, or those areas where livestock distribution is poor due to lack of management. Recreation areas, crucial watersheds and crucial game ranges are also areas which may fit into this category.

Unsuitable Range - These are range areas which have no value for or should not be used by livestock because of unstable soils, steep topography, barrenness, dense timber, inherent lack of forage, inaccessibility, or unreconcilable conflicts with other uses. Some examples of unsuitable range are rock cliffs and escarpments, barren areas, rock slides, areas of down timber, dense timbered areas or brushfields, steep slopes, unstable soils, etc.

One distinction should be made here, and that is the fact that usable range and suitable range are not necessarily synonomous. For example, a range area may produce forage and be accessible and therefore be usable, but because of undesirable inherent soil characteristics, use of the area by livestock would result in damage to the soil resource of this area or adjacent areas and therefore would not be suitable.

Now, how about the application of range suitability classification? Size, vigor, reproduction and composition of vegetation are controlled to varying degrees by natural limitations of the site on which it grows. If we don't recognize and compensate for these limitations, our management plans are likely to fail regardless of how polished or refined they may be otherwise. Grazing capacities are determined to a large extent by proper classification of rangelands. In most cases, compensation was made along with our range surveys. Some of these compensations which have been made are adequate, however, some of them are not. The Range Suitability Manual will provide guidelines for recognizing and compensating for limitations of those rangelands which have not previously been graded or where previous compensation has not been adequate.

Classification of a range as potentially suitable or unsuitable will not, in most cases, require that the area be fenced from the suitable range. Normally, if we stock a range only to the grazing capacity of the suitable range, we will insure that livestock make little, if any, use of the unsuitable area. There is probably no need to concern ourselves with what little slop-over there may be.

Once a range is classified, doesn't mean it will be that way forever. The classification is made at the time an allotment management plan is being formed. If later allotment evaluation indicates a need for change in management and evidence shows the original suitability classification to be in error, the allotment will be reclassified.

The importance or priority of factors which govern the suitability of a range for grazing may be extremely variable between one area and another -- even within allotments. What may be a solution to a grazing management problem in one location may complicate the problem in another.

A great variety of vegetative types and conditions exist on the lands we manage. Each area has its own limitations. Because of this variability, it is impossible to establish standards that can be used Bureau-wide

state-wide or even district-wide in making adjustments for the various factors. However, we should have uniformity in approach, procedures and record keeping when possible. What has been developed are guides -- only that -- guides to point out factors which must be considered in overall management planning and allotment evaluation. Decisions -- or at least determinations -- must come from the field by people who have a working familiarity with the area under consideration. This approach leaves initiative in the field and allows flexibility for modification to meet the needs of a specific district or specific situation. The Service Center or Washington Office Range Staffs are available for assistance in making modifications or in reviewing any modifications made.

The suitability of range for grazing is determined by two major factors: First - physical characteristics of the terrain -- including steepness and length of slope, natural barriers, amount and distribution of water, and other factors that prevent free access to the animal; Second - the inherent characteristics of soil and vegetation. The natural physical limitations can be modified to some extent by management and development of ranges to provide more effective distribution of livestock. For example: Rotation grazing allows for periodic grazing and rest; heavy stocking for a short period forces livestock onto areas which may not otherwise be used; season of use, providing additional water, brush clearing and construction of livestock trails can also influence livestock distribution.

Factors which govern range suitability for grazing will be discussed separately and in more detail. First - slope. This may be the most critical factor limiting livestock use on mountainous rangelands, particularly on cattle ranges. Use is affected by the degree of slope, length of slope, kind of livestock (including class and age), familiarity of livestock with the range, the management system in effect, distance to water, location of salt and shade, fence locations, vegetative composition, brushiness, and possibly other local factors. Before a slope is classified we must consider the effects of its use on adjacent areas. Let's take cattle for instance. By preference they like to graze the gentle topography close to water. These preferred areas are quite often overgrazed and may be permanently damaged in an effort to force cattle higher upon the slopes. The soils in such areas are generally the deepest and capable of being the most productive, but under excessive use they will produce much less than their potential. Studies have shown that 80% of the cattle use is on slopes of 20% or less. The number of cow-days per acre decreases significantly when slopes are over 20%. See attachment #1 for an illustration of the relationship of slope steepness and up-slope grazing.

Sheep use is also affected by slope but somewhat differently than cattle use. Sheep prefer upper slopes and high basins rather than lower slopes and canyon bottoms. Sheep use is generally affected more by soil stability than topography. Management systems play an important role in the use of slopes. For example, under a rest rotation system of grazing, pastures are planned to make maximum use of forage. As the more accessible areas are used, livestock are increasingly forced onto less accessible areas. If management is proper under seasonal or season-long grazing systems, the extent of normal up-slope use can be determined by the livestock grazing an area. However, if the management system is not proper, the increased use up the slope will be extended at the expense of the lower areas. Cattle that spend 1/2 of each year in a feed lot or on gentle terrain don't take kindly to rough country and long, steep slopes. They almost refuse to use the rougher portions of the range until hunger has forced them to. This isn't good for the range and it's just as bad for the stock. Still, on the other hand, you take "native cattle" -- cattle raised in rough country and don't know any better -- they will use this rough terrain to their advantage and without harm to the range.

Next, in regard to physical barriers. These include natural and cultural features that excessively reduce or prevent free access of grazing animals. Examples include ledges, rockslides, bogs, down timber, heavy brush, large dams and reservoirs. Areas which are isolated from grazing use by physical barriers will be classified as unsuitable unless we can get stock onto them by constructing improvement projects such as roads and trails opening up brush fields, etc. In these instances where improvement is feasible and practical, the range will be classed as potentially suitable and will be reclassified as suitable when the "new" areas become available for use.

Class of livestock using an area may sometimes determine accessibility of the area. Other features to consider will include management practices such as range riding, herding animals onto remote or near inaccessible areas, salting practices, use of a different management system, etc.

The next factor is the one dealing with water. This factor is often of particular importance in differentiating presently suitable and potentially suitable ranges. It is one of the most influential features affecting livestock distribution. Under ideal conditions, cattle should not be forced to go over 1/2 mile to water on mountainous rangelands and should not be forced to travel over 2½ miles even on level terrain. On mountain rangelands, sheep should not be expected to travel more than one mile. If these distances are exceeded, damage to range may increase rapidly.

Just as the intensity of grazing decreases with distance up-slope, the intensity of grazing decreases as distance increases, away from water. This relationship varies with season of use, stocking rate, degree of slope, weather, location of salt, etc. If we stock our ranges to make the desired use of outlying vegetation, we will generally make excessive use of the forage closer to water. This may result in permanent loss of some grazing capacity. However, since stocking light enough to protect those areas lying close to water is not practical, it is necessary to define the part that can be "sacrificed" and still meet management objectives. The basic principle here is the same, regardless of whether land base or water base operations are involved. Final determinations of these "sacrifice" areas are guided by other local conditions. We certainly don't want to emphasize "sacrifice" areas, but these areas -- by whatever name we call them -- do exist under certain grazing conditions, so we have to recognize them. Certain management systems are available which will minimize or eliminate these areas and they should be utilized whenever possible.

The relationship between the availability of water and intensity of grazing can readily be seen on many ranges. Many areas supporting excellent range conditions are without adequate livestock water. As a matter of fact that is exactly the reason they are in excellent condition. On some winter ranges, water problems can be solved if livestock can make use of snow. Water is one factor which the District Manager may have some control over. He can affect changes to achieve better distribution of livestock by intensifying management and by requiring that water be hauled, by developing springs, drilling wells, and using pipelines to distribute water. In many instances the problem can be overcome by such developments.

The amount of vegetative cover on a site is another important consideration in classifying grazing suitability of rangelands, but as is the case with other considerations, the wide ecologic differences in environments make it impossible to generalize the minimum amount of ground cover needed to prevent runoff and erosion. Soil stability is dependent on the adequacy of vegetative cover. The minimum ground cover needed to maintain stability of watersheds varies with: slope and soil; the intensity, frequency, and form of precipitation; and climate in general. Vegetative cover is considered with respect to both present production and potential production. Inherent unproductive sites having no potential will be classed as unsuitable. Low productive sites can be classed as potentially suitable, if the possibility for improvement is evident.

Vegetative cover and forage production should not be confused with each other. Forage production is only a part of the overall vegetative production, and will normally not be used as a determining factor in grazing suitability classification. The relationship between forage production and grazing suitability is only in respect

to the effects of forage use on soil stability and watershed protection. We feel the use of other considerations such as slope, distance from water, soils, and total vegetative cover will eliminate the need for using forage production as a separate criteria. This should do away with one very difficult and "sticky" determination.

We should make every effort to provide additional forage on areas having potential so livestock can be relocated from the critical areas to areas where additional forage has been developed.

A series of studies in the Inter-mountain and Northern Rocky Mountain areas have indicated that at least a 60-70% ground cover (vegetation plus litter) is necessary to protect mountain slopes from excessive run-off and erosion from moderately high intensity storms. This, of course, varies with soil type and percent slope. However, protective cover and soil types are not as critical for runoff protection on desert ranges as on mountainous slopes because steepness and length of slope are generally less conspicuous. Let's take an example here and suppose an area has a 40% ground cover, an average of 25% slope, consists of a moderately stable loam soil. We class this area as suitable for grazing because rainfall occurs as gentle prolonged showers. A similar area, subject to high intensity summer storms, may be classed as potentially suitable or unsuitable because the 40% ground cover is not sufficient to hold the soil when subjected to these storms.

The next factor is soil.

Texture and depth of the soils play important roles in determining the intensity of use a site can withstand. We all know that very shallow soils usually have low producing potential, which makes it difficult to maintain an adequate plant cover for protection. Coarse soils are often so loose that livestock grazing will cause significant disturbance and loosening of the surface. Frequently, on slopes, such soils slough downhill, burying plants below and exposing roots of plants above. Some plants are pulled up or trampled out of the ground. It's very difficult for seedlings to become established on such coarse soils under grazing use. On the other hand, extremely fine textured soils may be equally difficult to manage. These soils are more readily compacted by grazing use. This lowers the infiltration capacity and tends to increase runoff. Some of the greatest extremes in soil gullying and erosion are found on fine textured soils.

Since sheep prefer upper slopes and high basins, soil stability is more critical than topography in determining suitability on most sheep ranges. Much steeper slopes can be grazed where soils have a high resistance to trampling and erosion. When a soil lacks these qualities, slope then becomes a more important factor of suitability determination.

Erosion hazard is another determining factor in suitability classification. When we speak of erosion hazard, we are talking about a combination of several factors. The major ones have already been discussed separately, and include (1) topography as related to length and steepness of slope;

(2) ground cover which includes amount (vegetation plus litter) and dispersion; (3) soil erodability or the inherent physical characteristics of the soil that influence its stability (primarily texture and depth); (4) climate is important as a measure of erosion hazard principally with regard to storm frequency, intensity and duration. A new manual release for Erosion Hazard Classification guidelines is being prepared. This will be of help in tying these major factors together. Areas of moderate erosion hazard can be classified as suitable or potentially suitable for grazing depending on their potential for improved protective cover (uniformly dispersed) to curtail surface runoff and provide soil stability. Areas with an extreme erosion hazard should be classed as unsuitable for livestock grazing. Some environments are not capable of supporting sufficient vegetal cover for soil stability. In these cases, a certain amount of geologic erosion will occur naturally. However, every effort must be made to reduce erosion and siltation through suitability determinations, management practices, and watershed structures. On highly erosive soils, complete protection from livestock grazing may be the only practical means of protecting the watershed.

See attachment #2 for a sample range suitability guide for cattle. A key of this type can be useful in making suitability determinations, however, each key will have to be formulated based on local conditions.

Most of the major factors we will normally encounter in making grazing suitability determinations have been discussed but there are other, more or less, local factors which may enter the picture. These include:

a. Poisonous Plants. This factor will generally be limited to relatively small acreages and, in some instances will influence the season of use.

b. Forest Areas. These may be an important consideration in some districts, and special attention is needed to determine the extent of their suitability for grazing. Analysis may include forest species, density of stand, density and kind of understory, forest management objectives and plans, amount of down timber, and forest age class. In any event, close coordination with the district forestry program is required.

c. Burned Areas. If the site was classed as suitable prior to the burn, then it will probably be deferred from grazing for 1, 2, 3 or more years - depending on a number of factors such as vegetative type, intensity of burn, etc. This is actually a deferment rather than a suitability classification and applies to sprayed areas as well as burned areas.

d. Crucial Wildlife Areas. Many ranges which are completely usable by livestock may also be crucial wildlife areas, and therefore special consideration is required. Local situations will guide the decision resulting in suitability classification. An example can be found on a crucial big game winter range. If the area can be grazed by livestock during the spring or early summer without damage to other range resources, it can be classed as suitable. The problem then becomes one of season of use. In many cases, exclusion of domestic livestock grazing permits

improvement of herbaceous forage with subsequent decline in vigor and reproduction of wildlife browse plants. Therefore, prolonged exclusion of livestock from big game habitat is not generally a recommended procedure. Such joint-use areas may benefit from a short period of protection from livestock and, in such cases, should be classed as potentially suitable until the browse has recovered its vigor.

e. Crucial Watershed Areas. Special consideration is required in areas having crucial watersheds. For example, when dealing with frail lands, an area may be classified as frail because of condition, yet it has potential for meeting suitable classification standards after a period of rest or treatment. This area would be classed as potentially suitable. Another area may fall into the frail land category because of soil characteristics such as instability, course texture, etc. This area does not have potential for livestock grazing purposes and would be classed as unsuitable.

Mapping Range Suitability. All ranges being analyzed for grazing suitability will be mapped according to their classification. See attachment #3 for example.

1. Mapping symbols.

a. Suitability

S - Suitable Range

PS - Potentially Suitable Range

U - Unsuitable Range

b. Vegetative Type. The suitability classification symbol is followed by a standard vegetative type symbol outlined in the Forage Survey Handbooks.

c. Reason for Classification. Range areas mapped as potentially suitable will be designated by one of the following symbols:

B - dense brush
D - down timber
F - frail or unstable soils (crucial watersheds)
G - conflicts with crucial wildlife areas
I - inaccessible
L - low production
P - recreation area development
R - rocks
T - dense timber
W - lack of water

Unsuitable areas will also be designated by these symbols, but the letter will be preceded by the numeral 7.

This designation will follow the vegetative type symbol in parenthesis.

d. Trend. Apparent range trend as determined by studies conducted under BLM Manual 4412-22C will be designated with symbolic arrows:

→ - static or not apparent

↑ - up

↓ - down

e. Acreage. A line will be drawn under the previously discussed symbols and the acreage of each mapped area will be recorded beneath the line.

And finally, we come down to the final point - which is - you can't count forage available as feed if you can't get it into the grazing animal. Whatever the underlying reason or reasons for classifying a range as suitable or unsuitable, it is essential that it be done as a prelude to or a part of management planning.

RANGE SUITABILITY GUIDE FOR CATTLE *

Attachment #2

A. Inherent productivity low, no potential for improvement - unsuitable.

A. Inherent productivity not limiting.

B. Not accessible to cattle under practical management - unsuitable.

B. Accessible to cattle.

C. Soil erosion hazard low.

D. Slopes 30 percent or over and above 0.4 mile from the bottom - unsuitable.

D. Slopes 20 to 29 percent.

E. Vegetative cover less than 10 percent - unsuitable.

E. Vegetative cover over 10 percent.

F. Current erosion moderate to severe - unsuitable.

F. Current erosion light to none.

G. Distance from water over ½ mile - unsuitable.

G. Distance from water less than ½ mile - suitable.

D. Slopes under 20 percent.

H. Distance from water over 1 mile - unsuitable.

H. Distance from water less than 1 mile.

I. Erosion rate moderate or severe - unsuitable.

I. Erosion rate light or none - suitable.

C. Soil erosion hazard high.

J. Slopes over 20 percent - unsuitable.

J. Slopes under 20 percent.

K. Distance from water over 1 mile - unsuitable.

K. Distance from water under 1 mile.

L. Erosion rate moderate or more - unsuitable.

L. Erosion light to none - suitable.

* All determinations are guided by local conditions

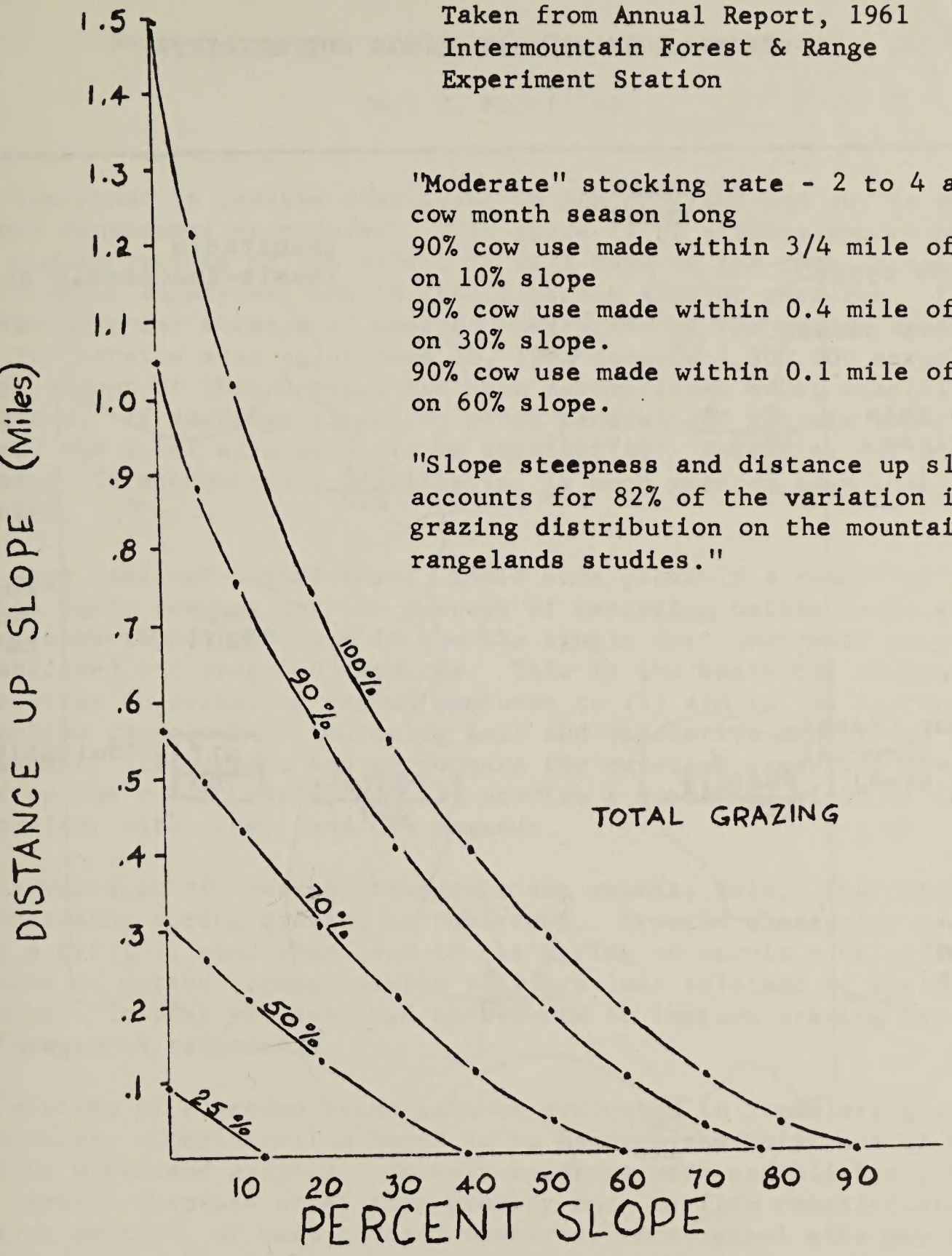
Illustration 3
(.13B1a(1)

RELATIONSHIP OF SLOPE STEEPNESS AND UP-SLOPE GRAZING

Taken from Annual Report, 1961
Intermountain Forest & Range
Experiment Station

"Moderate" stocking rate - 2 to 4 acres/ cow month season long
90% cow use made within 3/4 mile of bottom on 10% slope
90% cow use made within 0.4 mile of bottom on 30% slope.
90% cow use made within 0.1 mile of bottom on 60% slope.

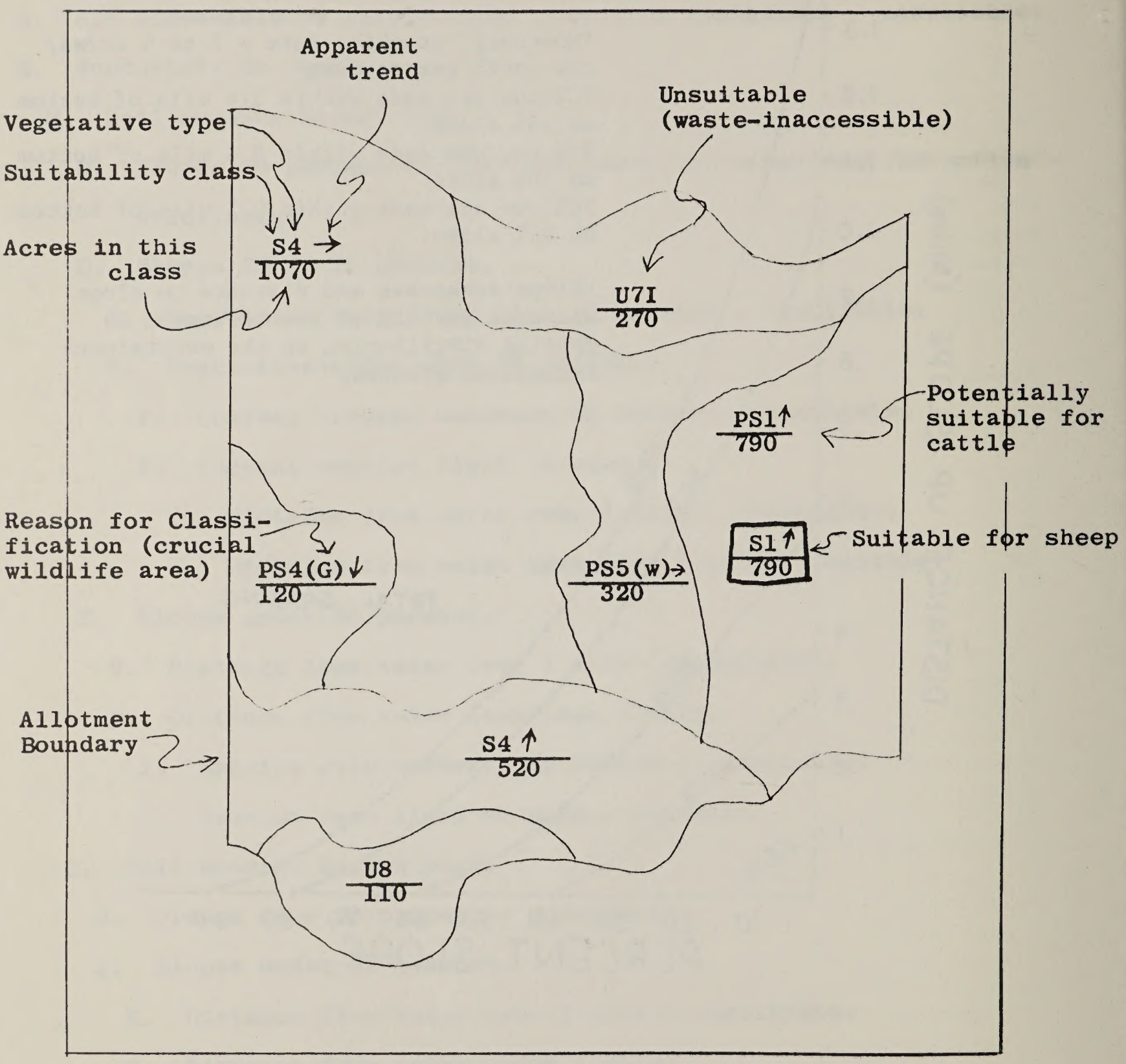
"Slope steepness and distance up slope accounts for 82% of the variation in grazing distribution on the mountainous rangelands studies."



Distribution of cattle grazing up-slope in relation to slope steepness under moderate stocking rates. Curves show the proportion of total grazing occurring below the indicated distance up-slope.

Illustration 4
(.13 C)

EXAMPLE OF MAPPING RANGE SUITABILITY



MANAGEMENT OF CRESTED WHEATGRASS

Range Management - Wildlife Training Conference

Carl P. McCrillis

How important is crested wheatgrass in BLM programs and why do we need manual management procedures? This grass is of primary importance to the Bureau because of the effect it will have on the total range resource, and crested wheatgrass has in itself become a major resource. For instance, total acreage of crested wheatgrass on the public lands within the PSC service area as of June 30, 1965 exceeds 1,500,000 acres. A large amount of this acreage has been accomplished under special control programs. If seedings placed on other federal and private lands were added, the total acreage would be substantial. Potential for additional seeding, if economically justifiable, is much greater than that already planted.

Why were seedings established? There were probably a number of motives. In the past, seeding for the purpose of restoring native rangeland has been least emphasized, but is now the single most important purpose for established and proposed seedings. This is the basis for current policy objectives in utilizing seeded pastures to (1) aid in the restoration of native rangeland by improving soil and vegetative conditions through deferment, (2) protect and perpetuate the existing grassland development on the public lands, and (3) provide a sustained yield of forage consistent with other land use demands.

The advantages of crested wheatgrass are several fold. The point of withstanding spring grazing is important. Crested wheatgrass seedings fill a critical need when used in the spring to permit a delay in turnout on native forage species that are less tolerant of spring grazing. In that way seedings contribute to improve grazing management of integrated rangelands.

The ecology of a seeded range must be evaluated in formulating management procedures. Consideration needs to be made of the tolerance of the site to withstand grazing. Certain seedings were established primarily for certain purposes other than grazing such as fire rehabilitation, erosion control, or weed control measures. A marginal site may deteriorate as a result of what might be normal grazing on a good site, so that special management considerations, such as deferment or alternate year's rest, will be required. Improvement in thinner stands on good sites may be obtained by grazing occasionally in the fall or winter rather than always during the spring. The associated rangeland may also play an important goal in the management plan, if, for example, a large amount of native range is a part of the seeding.

Average annual precipitation may strongly influence grazing use to be made. Considerable ecological variation will occur throughout the west and management will depend in part on the existing environmental factors at each location. The invastion of undesirable brush onto seeded rangelands is an important problem in some areas. Reinvasion of sagebrush in the sagebrush-grass type, for example, can be expected in varying degrees. The role of management in preventing stand deterioration may be very important. Continual early grazing can reduce plant vigor. Season-long grazing which begins early in the year can seriously affect plant reproduction and density. Management objectives, then, must be kept in perspective with the physiological requirements of the plants to maintain the ecological balance desired.

The productive capacity of an established crested wheatgrass seeding is a function of site quality, management practices, and climate. Greatest production usually occurs on a seeding during one of the first few growing seasons then productivity declines to a relative norm. Data from studies in the various western states indicates a wide fluctuation in production of crested wheatgrass stands. Production figures range between 500 and 1500 pounds of air dry material per acre.

During early spring, production is near minimum and the percentage of the total yield available for livestock is low. For example, percent of the total annual production of crested wheatgrass properly available to livestock approximates 20 percent in early spring, 30 percent in late spring, 45 percent in early summer, and 65 percent at mid summer. These figures will increase when grazing is made of regrowth in the fall or the following spring.

Variations in total annual production can exceed 500 percent between the best and poorest year. These changes are due primarily to variations in weather.

An expression of grazing capacity is relative, and the important variables of periods of use, site and stand quality, and management must be considered when expressing grazing capacity. Major change in any of these variables affects the grazing capacity. However, western range data indicates a general grazing capacity of crested wheatgrass ranges for spring use of between 1.5 acres to 3.5 acres per animal unit month. summer and fall capacity of ungrazed pastures would be progressively greater.

The primary purpose of crested wheatgrass is to provide spring feed to defer use on native ranges by grazing livestock. Use during the summer, fall and winter is of secondary importance. Use at other times should be made only if forage of seedings becomes available in excess to that required to meet objectives of proper spring use in conjunction with improvement in the condition of native ranges.

During the early spring, grass growth is slow and the percentage of the total annual forage production is low. In contrast to the quantity of forage, the quality is highest during the earlier part of the season and this becomes progressively lower as the year develops. Grasses provide the most nutritional value during spring and early summer.

Determining dates for beginning and ending spring grazing shall be based on sound physiological principles and environmental and phenological conditions. However the time of initial grazing and stocking rate depends upon management objectives - deferment or rotation combinations, two-crop management or season-long grazing. Earlier use can be made if compensating management techniques are employed.

Grazing animals can successfully utilize crested wheatgrass during the summer season. Pastures used for summer grazing are those deferred during the spring. Grass at this time of year is becoming dry, mature and deficient in nutrients. However, gains made by calves and yearlings are often resonably good throughout the summer.

Crested wheatgrass stands which were not grazed the previous spring may be grazed in the fall at a heavy rate with little or no detriment to the seeding. However, if use is to be made early in the following spring, it is most desirable to have old feed left available for the beginning of the next season. In pastures to be grazed under a two-crop schedule, early spring and then fall use, fall stocking levels, if any, are dependent upon the annual production.

Proper utilization levels will vary by site location and site quality. Approximately 45 to 65 percent of the current total dry weight herbage production of crested wheatgrass seedings can be utilized properly by grazing livestock during a normal year. During abnormal production years, the percent utilization will be above or below desired levels unless the number of grazing animals or length of season is changed.

Grazing crested wheatgrass too lightly encourages stemmy growth which is unpalatable, of poor nutritive quality, and interferes with subsequent grazing.

The number of grazing animals, distribution of water, favored feeding areas, shading spots and terrain all play an important part in determining how crested wheatgrass seedings are used. As the season progresses, distribution and utilization become problems. Depending upon management objectives, more livestock could be added. When beginning grazing later in the year, large numbers of livestock over a relatively short period of time will result in a desired uniform intensity of use. The degree of use the previous year has a significant effect on palatability the following year. Seeded pastures are frequently under-utilized resulting in a "wolf plant" situation and it is often necessary to initiate remedial management action. Fall or winter grazing with a large number of livestock removes old forage and cleans a pasture to a uniform use level. Mowing, beating, or controlled burning are other means of removing dry plant material to encourage leafy growth the following spring.

New crested wheatgrass seedings should not be grazed until such time as the young plants can withstand pulling without uprooting. Seedings require initial protection to become established as well as protection from abusive grazing. New stands of crested wheatgrass can usually be grazed the year following the first crop of seed produced. Some seedings by fall of the first year are well developed, vigorous and have produced a seed crop. In this situation limited grazing may be possible at the end of the first year. New seedings on sandy soils generally require at least two growing seasons to establish root systems prior to grazing.

Grazing at sometime during the spring is the most common use pattern, and with favorable growing conditions, a desirable forage can also be produced for late summer or fall grazing. Grazing crested wheatgrass under a one or two-crop system will reduce undesirable reproductive stemminess and provide variations to meet management objectives.

Grazing crested wheatgrass from the time five leaves have emerged and are approximately 6 inches high until the heads are in the boot constitutes the first pasturing under two-crop grazing. Stocking rate needs to be adjusted to achieve close grazing near the end of the first use period; but close grazing must not occur too early. An average stocking rate will approximate 3-4 acres per cow. Heavy stocking near the close of the spring grazing period stops further growth of seed stocks. If grazing is close enough and soil moisture is adequate, regrowth will be leafy. Close grazing at the proper time nips seedhead development and forces the plant to start new growth. Second growth herbage may be grazed in late summer or fall but should not be utilized until fully cured. In dry seasons there will be little or no second crop herbage. Two-crop grazing depresses root growth slightly, reduces total herbage production, provides for only a short grazing season, and variations in livestock numbers may be required to achieve close utilization toward the end of the first grazing period.

Grazing crested wheatgrass from the time when the heads are in the boot until the spikelets are in anthesis constitutes one-crop grazing. Stocking rate needs to be adjusted so that grazing is close and uniform approximate to mowing for hay. An average stocking rate will approach 1-2 acres per cow. One-crop grazing depresses autumn storage concentration of carbohydrates in the roots, and use is delayed until late spring and the grazing season is short.

A rotation combination of two-crop and one-crop grazing may be advantageous in providing for specific management needs. With, for example, three pastures of equal size, two of them can be grazed early for two-crop production and would carry about as many animals as one of them will carry later under one-crop grazing. Cattle can be divided between two pastures early, then combined into the third field later to obtain a longer grazing season. Although a given pasture might be grazed for either one or two crops of shoots every year without damaging the stand, a rotation between two-crop and one-crop grazing might help maintain high production on all pastures.

Use of seeded areas requires intensive management. This management must also meet the objectives of the established management system for the integrated grazing area.

One and two-crop grazing of crested wheatgrass are based on patterns of plant development. Grazing without attention to stem morphology can produce less desirable results because reproductive or leafless culms are less palatable and nutritious than fully developed, vegetative or leafy ones. Grazing before proper leaf height growth and five-leaf blade exposure removes the leaves without removing or damaging the growing points, and reproductive culms later arise unhindered and leafless. After five-leaf emergence, the elevated growing points are grazed which halts reproductive development and the subsequent regrowth is composed of vegetative stems.

Grazing management adaptations may be needed to bring about desired changes in crested wheatgrass stand density or vigor. The characteristics of crested wheatgrass are similar to other grasses of the same ecological zone and the management techniques used to affect vegetational changes are similar. For example, a seeding may be in low vigor because of continuous early spring grazing. One or more full year's rest, deferred use until summer or until after seed maturity, or alternate winter use are optional management approaches to improve plant vigor. Increasing density through reproduction can be accomplished by grazing after seed maturity to trample seed into the ground followed by one or two year's rest to allow for establishment of seedings.

The rate at which improvement is desired will determine the intensity or duration of the management choice. Management adaptations offer a good approach to grazing integrated seeded and native rangelands. Managing grass to meet plant growth requirements and derive sustained forage for livestock requires that beginning grazing be at the proper time. However, these criteria can be modified to meet early season grazing pressures if needed. Early spring use, for example, provided soil conditions are satisfactory, can be made for short periods as long as such grazing is the total use for that year. A pasture will be grazed only once early in the spring and livestock removed soon enough to allow for regrowth. Removal date will be prior to the time when grazing is most detrimental to the plants. Pastures grazed in this way will contain old growth for use in the spring. Either crested wheatgrass or natural pastures can be used singly or in combination in this manner. Rotation every few years of the early spring pasture is required. Where range improvements have been made to adequately manage livestock, it may be preferable to begin grazing on one native perennial range early, use crested wheatgrass when ready, then go to other native pastures for summer use.

Crested wheatgrass seedings cannot be properly managed without adequate livestock facilities. Adequate fencing to form a suitable number of manageable pastures with sufficient watering locations is the most desirable means of use. If convenient to management objectives, crested wheatgrass pastures can also be utilized to good advantage as breeding fields to improve livestock production. The productive potential of crested wheatgrass offers possibilities for moving livestock. Every effort should be made to relieve depleted regions by shifting additional spring grazing to crested wheatgrass whenever forage is available. Seeded forage can also be utilized to relieve livestock grazing on critical big game habitat areas. Reasonable travel distances which do not cause undue hardship on a livestock operation can be justified on the basis of needed rest of native range and the availability of crested wheatgrass forage.

GRAZING MANAGEMENT SYSTEM

GRAZING MANAGEMENT SYSTEMS

F. Kelly Hammond

I. Introduction.

Grazing management systems are designed to manipulate livestock grazing in relation to vegetative characteristics to accomplish management objectives. The objective of a BLM grazing system should be to obtain a desired level of sustained forage and livestock production from the public lands in accordance with multiple-use objectives. Livestock manipulation through grazing management systems is one of our most practical tools for improving and maintaining soil stability and forage production on the public lands.

II. Basic Considerations.

All BLM grazing systems should be based on the physiology and phenology of the Key Forage species.

A. Vegetation. To establish a grazing system one should know what effect grazing has on the plants. Unlike animals, plants make their own food. This food is used to build tissues and for energy to carry on life processes. In the case of most perennial plants, some of this food is stored in the roots or stems and is used in the production of new growth the following and succeeding years. Grazing during certain seasons of the year interferes with both production and storage of food, and can result in death of the plant. The plant can make food and store it only when it is green. Most of the food is made in the leaves. So if the plant crown is removed by grazing during the green period, the plant cannot make or store food.

The critical period in the life cycle of the plant appears to be,

(a) the period of active reproduction, from flower-stalk formation to and including seed ripening, and

(b) the forepart of the normal carbohydrate storage period.

B. Soil. Grazing use may affect soil stability by compaction, decreasing plant cover and by reduction in litter accumulation. The importance of compaction and disturbance varies greatly with the soil type. In general, the more finely textured the soils, clay and clay loam, the greater is ease of compaction. The principal immediate influence of grazing on soil stability is reduction in litter deposit and accumulation.

Vegetation is intimately involved in the management of soil. Not only is vegetation an essential agent in building of soil; it provides a protective cover essential to soil preservation. Because vegetation depends on soil for its existence and because of the formation and protection of soil by vegetation, the two are closely and obviously interdependent.

The resource manager's first concern is with adequacy of the vegetation, living plants and organic mulch, to protect the soil. If soil is being lost, then he modifies his grazing management system.

C, Animal. Animals may change the composition of the vegetation by selective grazing and by trampling. Grazing animals tend to concentrate on certain parts of ranges and to avoid others. The tendency varies with the kind of animal, topography, water location, and other factors. The major forage plants, poisonous plants, etc., influence kind of animal as well as frequency and time of grazing.

A grazing system should be established to take advantage of these factors in working toward management goals.

III. Design and Selection of a Grazing System.

A. Procedures.

1. Goals - Before establishment of a grazing system, the goals or management objectives should be determined.
2. Evaluation of range area or allotment.
3. Selection of Key Species (the species ecologically adapted and most desired for forage cover.)
4. Initial stocking rate.
5. Desired season of use.
6. Necessary treatments.

B. Design. The design of a grazing management system should be towards accomplishing goals or management objectives. Also to provide a method of harvesting range forage with sustained livestock production and with a minimum of injury to vegetation and soils. The system may vary from very simple to complex. However, in range rehabilitation most systems will require periodic rest.

Since almost every range presents a different grazing management problem, there is no set formula for arriving at a desired grazing system. It is necessary then that the resource manager determine the physiological requirements of the selected Key Species for each allotment. Then manipulate the livestock use to fulfill these requirements. There are four factors to consider in livestock manipulation:

1. Proper number of livestock (stocking rate). The number of livestock is probably the most important of the four factors. Numbers govern intensity or degree of grazing use within vegetative types. These vegetative types are made up of a varied composition of species, all of which react differently to intensity of grazing. The influence of close grazing results in damage to choice forage plants and changes environmental conditions through trampling and packing of the soil.

2. Proper kind of livestock. The various kinds of range livestock differ greatly in their grazing habits. This is likewise true of big game. There is a marked difference in preference for grass, forbs and browse. Integration of use between domestic livestock and big game is an ever-mounting problem. Through manipulation of kinds of livestock a solution can be reached in balancing the needs of all classes of animals with the vegetation.

3. Proper season and frequency of grazing. All ranges are best maintained in satisfactory condition if grazed at the time when the physiological shock is at a minimum to Key Forage plants. However, under practical livestock management, this is not always feasible. So the next best thing is to adjust seasons and frequency so that effects are not beyond physiological tolerance of the Key species. This may be accomplished through adoption of certain grazing systems.

4. Proper distribution of livestock. Proper distribution of livestock is important in good management. In fact, without it a range may be properly stocked yet overutilized in some areas, and under in other areas. Fencing, salting, riding and water development and access all aid in proper distribution on a range, as well as certain grazing systems.

C. Selection. After the resource manager has completed his evaluation of the allotment, established the management objectives, selected the Key forage species, and determined critical growth requirements of this species, he then selects a grazing system that will best manipulate all factors to work towards these goals.

The initial system may not be one that will accomplish the highest level of desired management due to lack of range studies, economic situation, lack of cooperation, topography, etc. However, the ultimate goal should be towards management of the allotment that will reach and maintain the objectives that have been established.

Grazing systems should be flexible as climatic variations, fluctuating livestock and wildlife numbers, fire damage, etc., might cause seasonal changes in formula. However, when a grazing system has been selected for a particular allotment, every effort should be made to adhere to formula until such time that range studies over a period of time indicate that a change is needed.

The basic principles for design and application of the BLM accepted grazing systems are as follows:

1. Continuous Grazing. This is the most common grazing system in use on BLM administered lands. It is merely placing the livestock on the allotment and allowing them to remain indefinitely in the case of yearlong grazing and throughout the season in the case of seasonal grazing. The pattern of use is never altered nor is any provision made for vegetative reproduction.

Usually little or no improvement results under continuous grazing if the grazing period covers the growing season. This is due to the fact that plants, unlike animals, make their own food. So, if continuously cropped, no food can be made or stored, as this process takes place when the plant is green and leaves are on the plant. The selective grazing habits of livestock contribute to additional deterioration under this system.

Continuous grazing has many disadvantages from range rehab standpoint.... some of which are: (1) contributes to mechanical damage to plants from trampling and compaction of soil. (2) interferes with growth requirements of plant, (3) little or no seed is usually produced, (4) reproduction is prevented and there is a gradual decline in grazing capacity of the range, (5) even if the allotment is,on average, used correctly, the more desirable forage plants are still likely to be destroyed due to grazing habits of livestock.

Continuous grazing does have the advantages of: (1) a minimum of investment in range improvement, (2) a minimum of moving and handling of livestock. However, when improvement or change in vegetative cover is desired, some other grazing system should be practiced. Even an accepted continuous grazing system should receive rest periodically by application of a non-continuous system.

2. Noncontinuous grazing. Noncontinuous grazing systems are based upon response of Key forage species and the formulation of a plan of grazing use for improvement of these species. The following are the major noncontinuous grazing systems as applicable to BLM administered lands.

(a) Deferred grazing - Deferred grazing means delayed grazing. It implies delay of grazing until after major forage plants have set seed, or for plants that reproduce vegetatively, until after other reproductive systems fully develop.

The objectives of the system are to promote plant reproduction, permit establishment of seedlings, or restore vigor of older plants.

Some disadvantages to the system are: (1) additional pasture area is needed; (2) inability to defer area because of lack of water; (3) greater investment for fencing and water development; (4) mature forage less nutritive value than green forage; (5) not applicable to ranges which are made up of vegetation which is not palatable after maturity.

This system has merit for use on some short grass ranges of the southwest where deferment is needed during summer growing season. However, to be most efficient and effective, it should be used in conjunction with some other type of grazing system.

(b) Rotation grazing. Rotation or alternate grazing consists of transferring the livestock systematically at suitable intervals during the growing season to different subunits of allotment and back to first subunit without specific provision for seed production.

The objective of the rotation system is based on the assumption that animals in large numbers make more uniform use of the forage, and to avoid cropping of the same subunit early in the spring, year after year.

(c) Deferred Rotation. Deferred rotation grazing is just what the title infers...a combination method of grazing. It involves dividing the range into units, which are grazed in rotation, delaying use on certain units until a specific growth stage of the vegetation is reached.

The objectives of deferred rotation grazing systems are to permit seed production, establishment of seedlings, restoration of plant vigor, and obtain more uniform use of the vegetation.

(d) Rest-rotation. Various studies on grazing habits of livestock indicate that their pattern of use is the same year after year under the same management. The same plants and areas grazed closely one year tend to be grazed closely the next. Thus, under continuous seasonal grazing, some plants are repeatedly cropped closely and in time are destroyed. As this happens, animals are forced to graze plants of lower preference or forced into less accessible areas. This leads to progressively larger areas of deterioration.

Selective grazing, therefore, is one of the main causes of range decline. Selective grazing cannot be prevented by adjusting stocking rate, nor by changing season of use without losing use of vegetation when it has highest grazing value.

Since little can be done to prevent selective grazing, it is necessary to graze the range in a manner which will counteract the harmful effects of selective grazing. The rest-rotation grazing system was designed to make this possible and thereby increase forage and sustain livestock production.

The only way good forage plants can be maintained or increased on livestock concentration areas is to periodically rest the range from grazing so the plants can grow a full crown; make and store food and have opportunity to reproduce. The timing and duration of rest periods are dictated by the growth requirements of the vegetation.

Under rest-rotation grazing heavy emphasis is placed on restoration of vigor to point where seed can be produced and where conditions are systematically created for establishment of desirable forage plants.

To obtain reproduction it is necessary to rest the range at three critical times in the following sequence:

(1) To restore vigor

(2) To insure development and ripening of seed.

(3) To insure establishment of seedlings.

The general form of rest-rotation grazing, therefore, consists of four basic steps:

(1) Graze the range.

(2) Rest the range until plant vigor is restored.

(3) Rest the range until seed ripens, then graze heavily to scatter and trample seed into soil.

(4) Rest the range until reproduction becomes established.

These four basic steps might take three, four, five, or more years to apply. The amount of rest needed in each case is determined by the growth requirements of the Key forage species. To apply yearly treatments, the range has to be divided into same number of pastures as treatments used.

RANGE AND WILDLIFE TRAINING WORKSHOP

April and May - 1966

ALLOTMENT MANAGEMENT PLANS - C. W. LUSCHER

I General.

The subject for discussion is management plans. This topic has been around for many years. Numerous plans, projects, etc., have been written in the past and placed in the files. However, it is real difficult to go to most any grazing district in the Bureau and find very many documented, current, action range management plans which are in effect. Range management plans are covered in BLM Manual 4110 Grazing Administration (Inside Grazing Districts) Part 4112.15. The service centers are at present compiling a new manual section on allotment management planning. I will discuss today, in general terms, some of the points of an allotment management plan which I feel are important.

Why do we need a plan of management for an area of rangeland? In the first place, this is one of the best ways to gain some direction to our management efforts. It is a starting point. Management plans provide a way in which the manager can document the situation and his objectives. What better way is there for any manager to know what is being done? Management plans, as I define them, are an action program--they are the documented portion of real range management. The objective of an allotment management plan is to devise an action program directed toward sustaining

good land conditions and a dependable supply of forage, in balance with the other multiple uses of the area. The plan identifies range problems, conditions, and opportunities for correlating the many management techniques into an effective action program. A plan must be designed to satisfy the physiological requirements of the vegetation, using the best grazing system, which system is in line with the principles of multiple use and considers the requirements of the livestock operator. The ultimate test of a plan is the amount of progress attained in improved land conditions and dependability of forage supply.

The long-range objective is to develop an allotment management plan for each allotment or use area which is to be retained for long-term multiple use management (Type I, II, and III Planning Units). An allotment management plan will not be required in Type IV Planning Units (Transfer Areas). The district manager should formulate only the number of allotment management plans which can be adequately planned and supervised.

Each plan will provide for coordination of grazing with other resource uses. Each plan will be evaluated periodically in accordance with Allotment Evaluation procedures--BLM Manual 4413.

An allotment management plan is a documented (written) and concise program of action designed to reach specific management goals. The plan is a tool for implementing the decisions reached on the management of the allotment.

The development of an allotment management plan should replace the use of a term permit. However, the plan may be attached as a stipulation to the term permit if better relations with the users will result. Allotment

management plans are issued for unlimited periods and are the basic document detailing the user's grazing operation, thus they are in effect until changed or modified as a result of changing conditions or objectives.

Initial allotment management plans may be developed on the basis of existing data. All existing basic data will generally be summarized and available from the Unit Resource Analysis (BLM Manual 1605). This data will be utilized where available. However, the lack of a Unit Resource Analysis will not preclude the development of an allotment management plan. Priorities for development of allotment management plans will be the same as those identified for allotment evaluation, BLM Manual 4413.2.

Any long-term adjustment or revision of the initial plan will be made only after an evaluation of the allotment has been completed (see BLM Manual 4413). Subsequent revisions will be based on this evaluation, the immediate and long-term needs of the land, the requirements of the public land users, and the programs and practices that will achieve the multiple use objectives. Short-term or annual adjustments will be handled as special instructions to the user.

The livestock range user plays a key role in the effective development and application of allotment management plans and in reaching management goals. This cooperation and assistance will be solicited in the development of the most practical and realistic plans possible. The plan must be simple, direct, flexible, specific, easy to apply, and clearly and concisely stated in terms understandable to the user. Upon completion, the plan will be made available for use by both the user and the resource manager.

The plans, when developed, can aid materially in obtaining acceptance of needed adjustments in range use. A thorough understanding of management objectives and the possibilities of successful management, including rehabilitation practices, is the key to cooperation in most situations. The success of a plan depends upon the care and foresight with which it is developed, and the zeal with which it is followed by everyone concerned. The plan is not only of great importance to proper management of the range resources, but to the economic success of the user.

II. Procedures.

The first step in the development of an allotment management plan is to gather all pertinent information.

The resource manager must carefully analyze all the data. He must determine what actions are required to attain both the immediate and long-range objectives for management of the allotment and planning unit. The evaluation will be accomplished by the range allotment evaluation system. (See BLM Manual 4413 - Allotment Evaluation.)

An effective management plan must be concise, direct, and contain the required flexibility to make it function, yet be realistic. Elements to be considered for inclusion in the allotment management plan are as follows:

Current Conditions - State concisely the condition of the resources and the quantity of forage available for livestock and wildlife use. Specifically, describe all the resource use problems and conflicts that you are aware of in the allotment. Sufficient background should be given to provide the

reader with an understanding of the nature and extent of the conditions you are describing. This section should include:

(a) Briefly describe the physical location of the allotment. Identify the acreage, both public and private, within the allotment.

(b) In a concise manner, list and show on the allotment map major vegetative types (including acreage) within the allotment, their importance, potential and any significant soil factors which may influence the production. The growing seasons and important phenology data concerning the key species should be described. Also indicate the effects of erosion within the vegetative type.

(c) List existing land treatment projects and acreage within each. These projects plus all other facilities must be identified on the allotment map attached to the plan.

(d) Prepare a brief qualification resume of the operator(s) in the particular allotment including: active use, suspended nonuse, etc.

(e) Briefly describe the present situation as it affects the grazing resources, including status of grazing capacity and results of adjudication. Identify the major problems in the area for both the social and physical resources.

(f) State briefly the relationships of range management to other resource uses or Bureau programs. What action will be required of range management to improve correlation?

Statement of Objectives - Describe what is to be accomplished by the management plan in the specific allotment or management areas, both from the standpoint of short-term and long-term objectives. Identify priorities for accomplishment when appropriate. When other multiple use demands require preference in the allotment, they must be identified and the livestock grazing use closely correlated to ensure the basic objectives are met. (Example: Crucial wildlife and watershed areas.) The expected benefits must be detailed and the generalized statements held to a minimum. Unless the objectives are quantitative and specific, it is impossible to measure the results of the plan.

Grazing System - Describe in detail the grazing system to be used in management of the allotment (seasonal, deferred, rotation, rest-rotation, etc.). (See BLM Manual 4112.16.) A grazing system is required and must be documented in the management plan.

(1) Summarize the available grazing capacity for the class of livestock. Indicate adjustments necessary to correlate wildlife use and watershed requirements on crucial areas.

(2) Describe the period of use to be made on each subdivision of the allotment. The detail will vary with the grazing system being employed. For example, under a rest-rotation system the various treatments must be explained as well as their sequence.

(3) Indicate management practices recommended such as salting, herding, bedding, water hauling, etc.

(4) It may be desirable, under certain circumstances, to enter into an agreement with the allottee authorizing him to exercise certain flexibility in his livestock operation. The range user must have demonstrated that he is a good range manager, he has a good grazing system in operation, and he has the ability and willingness to work cooperatively with the Bureau in improving the condition of the poorer range and sustaining the condition of that in good condition. The advantages to the operator in having this flexibility in his operation may provide an incentive for improved management with a resultant improved well-being of the land. Example: Give the user greater flexibility in his use of the public range in such matters as turnout date and removal date, so long as the use is made within the framework of a grazing system and joint field checks reveal satisfactory range conditions. The management plan for the allotment is the framework within which the range user is allowed to exercise use and flexibility. Therefore, it is necessary that the subject plan be comprehensive and realistic.

The management plan will outline the normal operation specifying the number, kind and class of livestock and the authorized periods of use of the range. In addition, the plan may outline the limits of deviation from the normal operation allowable within the discretion of the user. The normal operation should represent the most prevalent situation so that during the good growing seasons the range user might make greater use of the range, whereas, during the poor seasons, the use would be less than the normal operation.

Other Requirements of Plans.

(1) List the studies which have been made and indicate specifically what studies are needed. The minimum studies required are actual use, utilization, trend and climate. Others may be included as necessary. The key areas and crucial areas, if any, must be identified on the allotment maps. The key species in each vegetative type will be documented. It is of utmost importance that accurate actual use records are secured, since this data is vital in providing a basis for future management decisions. The plans will stipulate the manner in which actual use data will be secured. Failure of the user to supply actual use data may be cause for refusal of subsequent grazing use by the district manager.

(2) The plan will set forth the extent of utilization of the key forage plants allowable within the limits of proper use for the established grazing system. Guides to range readiness must also be included for use by the user and BLM. A determination must also be made as to the potential plant community desired. These specifications and requirements should be expressed in terms understandable to the user in order to avoid any misunderstanding.

(3) An understanding should be reached as to what range improvement practices will be applied to the allotment to facilitate the livestock operation. Provisions must be made for providing adequate protection for treated areas. This protection can readily be accomplished with certain grazing systems by scheduling the rehabilitation work during the rest period for the specific pasture. The plan will describe how these range improvement projects fit into and facilitate the management of the allotment. All proposed projects will be itemized in an appendix to the allotment management plan detailing the sequence and priority of projects.

(4) Each grazing area under an allotment management plan should be checked at least once a year to: (1) Aid in actual use data collection, and (2) Ensure the management plan and practices are being carried out. Problem areas will require greater attention and should be visited several times during the grazing season. Allotment management plan supervision should be accomplished jointly with the user(s) if possible.

(5) Special instructions to the licensee or permittee may be required because of variability of weather, damage to the range by fire, need for prompting on range improvement construction or maintenance agreements, rehabilitation plans and programs, and other range problems. Such instructions will be issued by the district manager when necessary and may be included in the annual license or in special written instructions or both.

(6) The management plan must be in writing and should be agreed to by the parties involved. The final plan should be signed by the range user(s) and district manager and copies of the plan furnished to each. If for any reason the user fails to agree to the allotment management plan, the district manager will render a decision following standard administrative procedures.

Service Center Review. Proper development, interpretation, and preparation of allotment management plans are essential. To ensure accomplishment of this goal, each district will forward their first initial plan, through the State Office, to the Range Management Staff of the applicable Service Center for review prior to implementation. Upon a satisfactory demonstration of plan sufficiency, the plan will serve as a guide to the district for future plans.

Filing and Record Keeping. A copy of the allotment management plan will be placed in the allotment file as prescribed in BLM Manual 4412.21G (not yet issued). A copy will be furnished the range user(s). An additional copy may be placed in the six-way case file.

PROGRAM MANAGEMENT
P.P.B.S.

Euel Davis

Briefly reviewed the Unit Planning process and how it relates to the Departmental Planning-Programming-Budgeting System. Pointed out the change from an "optimum" or "best" plan approach to the development and consideration of a wider range of alternatives. The Departmental PPB System would use program analysis techniques to analyze alternatives. Program analysis was described as:

1. Setting an objective,

2. Identifying and analyzing alternative means to realize objectives,

3. Review, and if necessary, change objectives,

4. Make decisions.

Described the realignment of the Unit Planning portion of the Bureau Manual from the 1700 series to the 1600 series. Gave emphasis to the change in instruction regarding the requirement to complete one Unit Plan per district this fiscal year. The requirement now is to work on one Unit Resource Analysis per district during the fiscal year. These instructions are in line with the Bureau Manual 1605.

Briefly reviewed the steps in Bureau Manual 1605. The steps in this process are:

1. Base and location maps,

2. General unit description in narrative form,

3. Inventory of the present situation - use of overlays, tables and narrative,

4. Identify and portray the known opportunities for development and management - use overlays, tables and narrative statements.

RANGE AND WILDLIFE TRAINING CONFERENCE
Winnemucca, Nevada

Discussion of PPBS - Bill Leavell

Current PPBS efforts by BLM have raised thought-provoking questions regarding future direction of a long term Bureau program (i.e. can we justify producing forage above that needed to meet present qualifications? What should be our response to an increasing wildlife oriented recreation demand?, etc.)

The Manual guidelines being discussed at these conferences provide alternative methods to accomplish range and wildlife management. The management tools to be used in a specific situation depend on the level of management desired. This level of management (or output production) has not yet been fully developed. We know that certain basic efforts must be carried out to protect the resources. The program memoranda prepared under PPBS are beginning to indicate production levels of the various outputs in water control, forage, visitor days, etc. Much is unknown about potential production of the public lands, and of the public need for the production. We must seek a balanced program effort responsive to public needs.

Certain trends appear to be emerging within Bureau activities. The following indicate the changes being tentatively proposed within the Bureau's program during the multi-year period (1968-72) subject to approval by BOB, the President, and Congress. These reflect preliminary analysis and selection of least cost alternatives for meeting projected public needs.

Percent emphasis in various PPBS Categories

	FY 67	FY 72
Water Control	21.0	27.6
Energy	2.5	1.7
Minerals	0.4	0.4
Land Resource Services	16.2	13.3
Forage &	10.3	7.2
Timber	19.3	10.7
Environmental Aesthetics	1.2	5.0
Recreation (& wildlife)	10.8	18.6
General Support and Fire Protection	18.3	15.5
	100.0	100.0

The range management program (including wildlife) is not being de-emphasized. It is receiving recognition under the PPBS effort as contributing to many products.

Allocation of Range Management benefits in PPBS

Water Control	Forage & Timber	Environ. Aesthetics	Wildlife Recreation	Fire Protection
43%	40%	3%	11%	3%

An example of one sub-category of PPBS output produced by the efforts of several Bureau activities is that of Forage Production and Utilization.

Its output (livestock AUM's, etc.) results from effort of:

Range Management	36%	Range Improvement	13%
Soil & Watershed	37%	Contributions	9%
Buildings & Roads	5%		100%

The Range Management program is changing within as to emphasis, and reflecting new direction and trends arising from a regulatory program to that of a management-type.

	1965 FY Contrib.	1967 Planned
Management	20%	38%
Supervision	26%	19%
Adm. (Services) efforts	47%	34%
Wildlife	7%	9%
	100%	100%

Outlooks from the PPBS Memoranda

Forage Production

(a) 160 million acres of grazing land provides forage for livestock of 26,500 range users. Insignificant until you consider this is about 40 per cent of the total livestock operators in the 11 western states.

PPBS requires analysis of forage needs, resource opportunities, applying cost-benefits to various alternatives of meeting the needs. Lack of knowledge exists regarding total local community benefits from public land forage. Must develop this information to analyze local needs and benefits.

(b) It is believed that a firm basis exists for producing forage to meet the forage needs as expressed by present qualifications. National forage needs are not evident based on economic projection studies until after 1980. Other alternatives of forage production in the West also exist, such as from soil bank land.

(c) We tentatively propose to produce forage to meet the qualification in areas when needs and benefits can be demonstrated recognizing also that forage is often a residual effect of other programs.

Wildlife

(a) Wildlife oriented recreational use is expected to double by 1972 (8 million visitor days in '65 to 16 million by '72.) Already there are 2° million hunters in the West.

(b) Western region public land provided 16 per cent of hunting needs in '65; anticipate over 25 per cent in '72.

(c) Recreational use is predicted to triple by 2000. Ninety per cent (90%) of all Americans will participate in outdoor recreation in 1966.

(d) Wildlife management was identified as one of the most critical problems in the Bureau in House appropriation sub-committee meeting this spring.

(e) In 1965-66 FY inventories of wildlife habitat and planning of improvement projects were to be accomplished. $150,000 of special cooperative projects was used. A material increase in 1967 was requested - appears about $1.3 million and 54 man-years is being planned.

(f) It is tentatively proposed that we meet the doubled wildlife need by 1972, by improving access and wildlife habitat conditions.

The 1967 AWP directives do not set commitment goals on management. However, districts will be expected to develop some managment plan studies, etc., testing and gaining experience in the new guidelines. It is recognized that the range and wildlife activities are but a part of total Bureau programs in the districts and that all efforts must be tied together. These new techniques and alternatives, etc., provide flexibility in utilizing the most feasible methods for reaching management objectives.

RANGE AND WILDLIFE TRAINING
Rawlings, Wyoming

Presentation Summary
Hugh A. Wall

1. Following the broader discussion by Euel Davis of the Denver Service Center on the PPB System, the analysis as it presently relates to range management was explained and the benefits from range management efforts in the areas of watershed protection and erosion control, livestock, forage, environmental aesthetics, wildlife and fishery habitat, and the support of timber production, etc. This places the range management program as an important and integral part of the Bureau's multiple use program. The participants were assured that any implementation of this system would be on a pilot basis prior to involving field.

2. The organization structure of the Washington Office was discussed and more in particular the functions of the Division of Resource Program Management.

3. The participants were assured that the program submissions were assured that the program submissions were being intensively analyzed and used at the Washington level and that considerable reliance was being placed on them for budget justifications and the writing of directives, etc. The new work categories in range management was discussed and how they now tie in with the new philosophies and trends in the Bureau's range management program and also with the new methodology on management techniques.

4. The goals of having allotment management plans on all public lands to be retained for management were discussed and the participants were told that at this time the target dates and goals were tentative and that a reanalysis of any goals or target dates will be done after receiving the 1969 program submissions. This analysis should give a better reflection of our actual workload in this type of work.

5. The Annual Work Plan was explained to the participants as a plan of work which firms down priorities between the types of work, etc. that are to be carried out during the year. The Annual Work Plans must be meaningful and adhered to for all practical purposes.

MANUAL 6600 - WILDLIFE MANAGEMENT

Frank W. Stanton

Highlights of a 67-page draft of this proposed manual were presented. It would replace IX BLM 8. The major headings are: Introduction, Multiple Use Coordination, Cooperative Relations, Wildlife Habitat Management, Wildlife Damage Control, and Administrative Procedures.

Multiple Use Coordination outlines requirements needed to insure coordination of wildlife habitat management with other Bureau resource management functions and engineering activities. Statements under range management coordination, for example, include the following. Design range use facilitating projects for use by both wildlife and livestock. Coordinate allotment management plans and range improvement programs with wildlife management plans. Devote special attention to crucial wildlife areas. Regarding engineering coordination: Keep the Engineering Staff advised about wildlife conditions and needs so that full coordination is possible during planning, design, and construction of projects.

Cooperative Relations section encourages each State Office to enter into a basic memorandum of understanding (Illustration I) with the State wildlife agency for the purpose of maintaining a sound working relationship. More specific supplemental agreements may then be developed for special cooperative management, development, research, or studies. Specific required steps are listed as procedure prior to permitting introduction of exotic wildlife species on public lands. Wildlife habitat improvement projects, cooperatively financed, are authorized by using Form 6601-1. Special land use permits are used to authorize removable habitat improvements entirely paid for by State wildlife agencies. Cooperation with other federal agencies and with private conservation organizations is essential to their understanding of Bureau programs and policies.

Wildlife Habitat Management objectives are listed as follows:

A. Identify lands having significant wildlife value.
B. Devote special attention to crucial areas.
C. Determine habitat requirements.
D. Improve habitat conditions consistent with principles of multiple use.

E. Give rare and endangered native species priority over other land use.
F. Make all Bureau personnel aware of the importance of wildlife.
G. Cooperate fully with other Federal and State resource management agencies.
H. Inform the public on wildlife habitat conditions.
I. Manage habitat on public lands with a minimum of special areas, such as game refuges.

A suggested outline for the wildlife phase of the unit plan is presented. Biological herd unit plans for major animal species will be developed and included with unit plans.

Provision is made for wildlife research and administrative studies. Studies relating to forage production and wildlife use are performed in cooperation with State wildlife agencies, and results are coordinated to arrive at one clearly understood conclusion. The Bureau should adopt State study methods where these methods are applicable. Minimum standards for big game range analysis are outlined. Habitat requirements of various game categories and fish are covered briefly.

Range and forest development practices can provide increased benefits to wildlife, particularly if certain modifications or additions are incorporated. Fencing of reservoirs not only protects the shoreline and improves water quality but it provides better fish and wildlife habitat and recreational opportunities. Likewise, protection of spring sources and fencing part of the overflow area to protect vegetation will improve water quality and provide food and cover for wildlife. All cistern (guzzler) type water developments for wildlife should be planned cooperatively with the State agency. Stream borders should be fenced with provision made for livestock watering. Selected browse areas on crucial big game winter ranges could be fenced to permit control of livestock season of use. All interests should be coordinated when planning vegetative control. In general, brush control projects should not be conducted in areas identified as having significant wildlife values. Artificial revegetation designed primarily to benefit wildlife should be conducted cooperatively with the State wildlife agency. Also, stream improvements to benefit fish should be made jointly with the State agency. Plans to construct new reservoirs should be evaluated for multi-purpose uses.

Wildlife Damage Control. Proper balance between wildlife populations and their environment is essential and requires coordination with the State wildlife agency. Predator and rodent control are functions conducted by BSF&W. Any need for controlling predatory species must be carefully considered and fully justified before starting a control program. Use of large scale poison bait programs is discouraged. An inter-agency memorandum of agreement must be completed before starting any control program. The district manager will review programs annually with BSF&W.

Administrative Procedures. Procedures to acquire access to public lands are stated. Posting of public lands by private interests is subject to trespass action.

The State Director is encouraged to convene meetings of wildlife members on district advisory boards within his jurisdiction for the purpose of considering wildlife aspects of BLM programs.

An annual wildlife report will be consolidated at the State level and submitted to the Washington Office by January 31. Districts have prepared an initial map of important wildlife habitat by species categories (big game, upland game, cold water fish, etc.). This map will be revised as necessary. A copy of each district map will be maintained in the appropriate State office. Important wildlife habitat will be shown as a separate transparent overlay to the unit planning maps. The annual report will consist of a tabulation (in units of acres or miles) by wildlife categories of the habitat shown on the district map.

4110 GRAZING ADMINISTRATION
(INSIDE GRAZING DISTRICTS)

Range & Wildlife Training Conference - Kay W. Wilkes

As with most manuals, changes or revisions in grazing administration manuals are usually necessary as soon as they are issued. Changes are necessary for various reasons; the most important is to redirect emphasis as we progress or complete priority programs. Very often needed changes extend to regulations as well as manual instructions. A good example of this is the glaring need to revise the Federal Range Code directing emphasis from the adjudication process to an intensive planning and management process.

In the time allowed for my presentation I will attempt to emphasize important parts of the Manual and point out the major changes reflected in the Grazing Administration Manual - Release 4-7, May 17, 1965 from Release 4-2 dated February 7, 1963. These manual changes do not necessarily reflect changes in the Federal Range Code or other regulations, but emphasize or interpret important aspects of the regulations. During the discussion, we will want to review any difficulty you may have encountered in working with the new manual. Also you may want to point out parts of the manual where changes are necessary or further refinement needed.

The revised manual is basically a reorganization of material in keeping with the new numbering system in the Code of Federal Regulations and incorporates provisions of new legislation.

Subpart 4110 - Purpose - Objective - Authority and Responsibility ---- incorporates the provisions of the Classification and Multiple Use Act as well as the Taylor Grazing Act as our authority and points out that lands to be retained in Federal ownership will be managed in harmony with their potential and the productive capabilities of the renewable resources. Grazing district administration is directed toward obtaining the optimum sustained yield of forage for use by livestock and wildlife in balance with a multiple use program designed to enhance and perpetuate the range resource and to facilitate maximum economic use consistent with long-term conservation objectives. Range resources include forage, soil, watershed, recreation and aesthetic values and wildlife habitat.

Subpart 4111 - Awards of Grazing Privileges -- has been prepared as a separate release 4-6 dated 2/9/65 and sets forth the requirements and procedures for adjudication and apportionment of grazing privileges. It has been prepared so that it could be included either with the regular manual or in a handbook cover.

The objectives under management needs point out that the award of grazing privileges shall be with the view of making a high level of sustained grazing use of the resource in accordance with the conservation, development, and protection needs of the land in balance with other demands and uses.

Stabilization of the dependent livestock industry is accomplished by the equitable apportionment of grazing privileges within the proper season, selected grazing system and capacity of the range. A good adjudication job will give us a good foundation to develop sound Range Management plans and will serve as a basis for most other range programs. The emphasis on annual licenses being issued until completion of the adjudication and then following with term permits has been eliminated - another subpart of the manual will emphasize development of management plans rather than pushing term permits.

The effects of transfers arising through operation of law provide that when an applicant acquires base property qualifications and is not a qualified applicant for some reason or other, a license or permit based on the acquired property will not be adversely affected for a period of two years. During this two year period, he can either qualify himself or dispose of the acquired grazing privileges. This provision has been in the Code for some time but this is the first it has been emphasized in manual instruction.

Minimum base property requirements are established by the district manager after reference to the Advisory Board for recommendation. The State Director is no longer required to approve these requirements. State Director's approval has been a manual requirement but not a Code requirement. However, changes in presently established requirements will become official only after approval by the State Director.

The adjudication and apportionment of grazing privileges must be made with multiple use considerations. Management plans and range improvement programs will include and be correlated with other uses and needs of the land. This section incorporates the requirement to determine forage production potential of the unit or allotment. The difference between the forage production potential and the present allowable stocking rate of the Federal range will be held in suspended status.

Emphasis is directed to wildlife cover and habitat as well as sufficient forage for the maintenance of a reasonable number of wildlife in each management unit of the district. This is the first grazing administration manual to emphasize cover and habitat in addition to the Code requirements for reserving forage for a reasonable number of wildlife. It is imperative that specific primary areas of wildlife use be identified and that reservation of forage be designated for the specific areas for applicable seasons of use and not merely assigned unit wide. (See IX BLM 8.4.2 for specific procedure).

The apportionment of grazing privileges will be based on the net base property qualifications remaining after case by case adjustments have been made. Whether the adjudication is made by agreement or apportionment, the grazing capacity must be equally distributed among the competing applicants in accordance to their base property qualifications unless modified by the willingness of certain parties to take less than their proportionate share. The total grazing privileges granted in a unit shall not exceed the estimated potential grazing capacity. The active use allowed shall not exceed the current grazing capacity after adjudication has been completed except while applying graduated reductions. The procedures for accomplishing the adjudication have been rearranged. The importance of factual resource information is emphasized. Complete knowledge of the adjudication problem and a positive plan of range management and rehabilitation are the best supports we can have to accomplish the adjudication job.

The present definition of adjudication has evolved over the years, resulting in additional requirements and refinement. Units or areas which have been adjudicated in the past under regulations and directives in effect at the time of adjudication do not necessarily have to be readjudicated because the definition or requirements have changed.

These areas will be evaluated by the District Manager and if he considers the unit or area adequately adjudicated to meet administrative needs and his State Director concurs, any modification required to conform to present regulations and directives will be considered as an adjustment and not an adjudication.

In certain adjudication cases where active rehabilitation programs are presently underway, grazing capacity determinations may be delayed until completion of the current rehabilitation projects. In such cases, the qualifications and equitable apportionment will be determined and only grazing capacity determination delayed. This concept must not be used as an excuse to avoid adjustments that should be made. Where it has been decided that the decision regarding grazing capacity will be delayed pending completion of rehabilitation work, it will be necessary to obtain nonuse commensurate with the forage production of the area of range not available for grazing use because of the treatment program.

After grazing capacities have been determined, initial grazing adjustments made, and plans of management installed on the range, future adjustments needed can be made as the basis of actual use records, forage utilization, and range condition and trend studies.

In conducting dependent property surveys, provisions are provided for intensive surveys only in those cases where the commensurability of the base property is questionable or where commensurability is known to be less than the minimum requirement. Where intensive surveys are not required, semi-detailed surveys will be made, based on the range users' statements of acreage and production of forage and crops harvested from the base property.

Special Advisory Board meetings may be held to consider range adjudications. When this is done, regular Advisory Board meetings may serve as protest meetings for the range users affected by the adjudication.

The district manager's decision to the range users putting the adjudication into effect must be so worded as to properly reflect the adjudication actions.

After adjudication and implementation of rehabilitation and range management plans, adjustments in grazing use are necessary from time to time. Rangelands are characterized by ever changing plant communities. Because of this, range management is a continuing practice directed toward improvement of the range.

Adjustments in range use are considered in two categories.

I. Short term adjustments -- are those adjustments that can be accomplished by the nonuse provisions or issuance of temporary non-renewable licenses.

II. Long term adjustments -- adjustments, either reductions or increases, that are certain to be of a long term nature usually due to loss of base property qualifications, changes in grazing capacity, disciplinary adjustments, etc.

Increases resulting from favorable response to improved range management and rehabilitation may justify increases in grazing use. Grazing capacity increases will be sufficiently conservative to either insure a continuing trend toward range improvement or to sustain an existing highly productive range condition. Increases will be apportioned to assist in stabilization of livestock operations controlling qualified base properties with emphasis on restoration of reductions imposed to reach grazing capacity and increased forage for wildlife.

When the grazing capacity exceeds the Class I qualifications, after proper consideration of wildlife requirements and conservation needs, such forage may be allocated among Class II base property applicants.

Care must be taken in the allocation of Class II forage to prevent overobligation of the resource. Establish management practices that will assure proper balance with other uses of the land. Base needed adjustments on adequate records of actual use, utilization and trend. Consideration should be given to the issuance of non-renewable licenses for the increased forage for a period of three years prior to the actual allocation of the Class II privilege. This will help assure that proper use is being made before the establishment of a privilege.

Allow increases to individual allotment users where possible in keeping with previous agreements or commitments made in allotment agreements. Multiple use management objectives may require modification or combination of some individual allotments. In this regard, refer unusual cases or problems to the Washington office for appropriate action. Use care in establishing new individual allotments making sure you have given proper consideration to grazing potential as well as base property qualifications.

Apportionment of available forage to Class II applicants will be governed by need to stabilize present operations.

Requirements and conditions include citizenship, proper season of use, year-round operation, minimum base property requirements and providing necessary improvements and facilities to properly manage the range area.

Preference order for Class II allocation is -

First. Owners of ranches and farms in immediate vicinity and those who are presently in the livestock business. Primary emphasis will be on need to stabilize existing operation, disregarding size of the operation. Excess forage will be allocated on the basis of average numbers of livestock owned but not utilizing public lands during the preceding three years.

Second. Preference is the same as one except to applicants in general area rather than the immediate vicinity of available range.

Third. Preference to applicants in immediate vicinity but without particular need to round out a going operation.

Fourth. Preference same as third except in general vicinity rather than immediate vicinity.

Before allocation of Class II forage is made, public notice is required to interested parties, groups and associations, describing the area of range available, amount of forage available, requirements of the applicants, order of preference and particulars for filing applications.

In addition, such notice shall be published in local newspapers and posted in local public places - (Savings Clause). In the event the amount of forage available or consideration beyond needs of present allottees would be impractical, public notice need not be given.

After Class II allocations have been made and later reductions are found necessary, they will be made in accordance with 43 CFR 4111.4-3 with adequate consideration to potential forage production realistically determined and which will be available within a reasonable time. Only stable long term grazing capacity resulting from range seeding, water spreading, additional water supplies and improved range management will be considered.

Suspended nonuse must be recorded on term permits and licenses as well as being adequately documented in the adjudication files. Care must be exercised to prevent confusion between suspended nonuse and regular nonuse. Suspended nonuse need not be a part of the annual application.

Subpart 4112 Management Practices emphasizes the need for the range management program to enhance other resource management programs. Increasing demands on the public lands necessitate that the resources be maintained in a condition that will readily permit future changes in management objectives and flexibility in resource use.

Range management programs must be geared to meet the changes and adjustments required by the other demands. In the conduct of a multiple use program, it may become necessary to exclude livestock grazing on an area to accommodate resource protection, watershed protection, recreation, etc. Areas from which livestock have been excluded by administrative action will be reopened to grazing use when the results sought by the exclusion have been attained or when conditions change and the reason for the closure no longer exists.

The majority of resources found on Bureau lands are closely related to and often dependent upon range management. Because of these inter-relationships and their effect on present or future production, the resource manager must understand all facets of multiple use management--timber and grazing, soil and watershed management and grazing, recreation and grazing, and wildlife and livestock grazing.

In order to adequately recognize and satisfy the needs of these multiple land resources, reductions in the number of livestock using the area or closing the area to livestock grazing may be required. For example, livestock may be excluded from a timber sale area or a reforested area for a certain number of years before and after cutting or reforestation projects.

A watershed may be closed to grazing when necessary to reduce accelerated erosion, increase water yield or prevent water pollution. Recreation sites may be fenced to exclude grazing. The effects of livestock grazing on fish habitat must also be considered, The impact on stream side vegetation and stream bank stabilization may require special measures. The winter forage requirements of wildlife, particularly big game, generally present a difficult problem. Adequate forage must be reserved for big game use in such situations, but big game populations should not be allowed to increase beyond the grazing capacity of such ranges.

When we have serious competition between Big Game and livestock, joint actions by agencies responsible must be taken to reduce the use of both game and livestock to the proper leve. When justified

by local conditions, domestic livestock may be completely excluded from range used by wildlife during any season. These exclusions should be periodically reviewed to determine the necessity of continuance. Proper dual use is usually necessary to keep grass species under control when heavy wildlife use is imposed on the browse species.

Management practice requirements emphasize proper determination of grazing capacity, proper season of use and range readiness.

Changes in season of use may be allowed provided the authorized use is adjusted to prevent damage to forage species. If the proposed change in season of use will result in damage to the range, it must be rejected. Range readiness is an important consideration because of the variation in elevation, slope, exposure, and forage types within the allotment or range area. It is important to control livestock so that they graze the various areas at the time desired considering the grazing system being used. The initiation of grazing use should be governed by the growth and development of the key species. Where it is not practical to vary the opening date each year, it will be necessary to establish grazing dates sufficiently late to prevent premature grazing during the late growing seasons.

The section on allotments points out that careful consideration must be given to the many factors involved in the establishment of allotments. Under principles of multiple use, individual allotments cannot be considered a panacea for range management problems. Each situation must be evaluated on its own merits. Ordinarily group allotments provide greater management flexibility. Group allotments often provide better opportunities for development of grazing systems; more equitable distribution of increased forage production resulting from range rehabilitation and improved management; better opportunity to develop a management plan for the area that will best fulfill the multiple use objectives for the public lands and less risk of individual operators being severely affected by land withdrawals for desert entries or other purposes.

Individual allotments work best where the range is relatively uniform, both as to present and potential grazing capacity and/or where there is a significant amount of private land intermixed with the Federal lands. The size of any new individual allotment in the future shall reflect due consideration of the realistic potential of the land involved and not just the existing grazing capacity. The establishment of small individual allotments in range areas with variable characteristics can make it impossible to adopt management practices or systems of grazing that are in harmony with the best season of use, variations in precipitation and other variables. Such allotments make any sizeable rehabilitation project impractical because of the inability to equitably distribute the benefits.

The section on range improvements points out the importance of improvements in protecting the range, improving range conditions and securing proper utilization and facilitating proper management of the resource. Range improvements should be constructed to facilitate multiple use objectives.

Rehabilitation of depleted range areas is futile unless the destructive forces are identified and corrective action applied. In no instance will rehabilitation be undertaken if adequate protection and proper management cannot be provided. Management plans prepared for allotments will include both improved and unimproved areas.

As already emphasized, a single comprehensive plan of management, protection, rehabilitation and development, etc., will be prepared for each planning unit and a range management action plan will be a specific segment of this overall plan. An effective range management plan must be concise, direct and flexible yet realistic. This action plan is required for each allotment.

Grazing systems provide a means of arriving at a planned procedure or technique for grazing a specific area. A plan of grazing will be developed using personal experience, an understanding of the resources involved, land physiography, water, feasible livestock control, and many other factors. A grazing system must be practical both to the user and the government. Adequate coverage has already been given to the specific grazing systems.

A section has been provided discussing subletting of grazing privilege for use of the Federal range with livestock by a third party through an arrangement with the duly authorized licensee or permittee. Subletting arrangements must show that the requirements of the Act and regulations can be met. Subletting on an annual, monthly or short term AUM, or per head basis usually will not be allowed.

Leases of less than two years are considered to adversely affect the proper management and protection of the public lands and should not be accepted.

Leases of two years or more in written form are acceptable and give the lessee the right to use the grazing privileges involved.

The licensee or permittee in many cases will not be the full owner of the livestock. He may have purchased the livestock on contract sale basis; he may be running the livestock on a calf-crop sharing or percentage of gain basis, etc. Such arrangements are permissible, provided the licensee or permittee is in the <u>livestock business</u> and has direct <u>control</u> over the <u>management of the livestock</u> and the livestock makes <u>substantial use of the base property</u> as part of a year-round operation.

Subpart 4113 Supervision and Inspection points out adequate supervision of the public land is the means by which the Bureau determines that the use of the land is in conformance with authorizations, that the use conforms with the objectives of multiple use management and that all uses are properly coordinated. The district manager shall designate the specific manner in which the range is to be used through the media of allotment management plans and specific license or permit stipulation. It is Bureau policy that each grazing unit and allotment be inspected at least once a year. The degree of intensity, of course, will depend upon range condition, history of compliance with regulations, demands and uses other than grazing. An inspection check list may be helpful in documenting records and assuring a complete inspection.

Subpart 4114 - Advisory Boards and Local Associations. No substantial change.

Subpart 4115 - Records and Administrative Procedures. Points out detailed procedures for setting up and maintaining case files, records on grazing capacity data, range studies, dependent property surveys, unit adjudication records, management plans and reports.

The procedures section provides instructions for issuance of licenses and permits. Term grazing permit designation replaces ten year permit references. Annual licenses may be replaced by term permits when proper adjudications have been completed and stabilized grazing operations established. Bureau policy will be to emphasize the development of management or operation plans rather than term permits, particularly where improved grazing systems are being initiated. Term permits, being inflexible, are applicable primarily in areas where intensive management programs are not contemplated. They may be issued for periods not to exceed ten years. The date of issuance will correspond to the license year of the district.

The reference to exchange of use licenses is now exchange of use grazing agreements. Such agreements must be correlated with the regular licenses and permits. The practice of issuing percentage on and off licenses will be discontinued except in those cases where they are clearly advantageous. Such exceptions will be largely restrictive to individual allotments. The issuance of exchange of use grazing agreements involving dependent base property will not result in the disqualification of the base lands. The exchange of use grazing agreement form was designed primarily to accommodate common use range situations. Where differing circumstances prevail, appropriate minor changes on the form may be required.

The section on billings, collections and payments of fees, provides that amended applications for use different from that authorized may be considered not less than 10 days in advance of any grazing period and, if approved, an amended fee notice will be prepared providing for increases or refunds of fees. Delinquent accounts section makes

reference to a Solicitor's opinion 10/13/58 Subject: Grazing Fees. Eagle Trail Ranches, Inc. Ariz. #3 which points out that where annual licenses are concerned, failure of the applicant to make timely payment of fees will be cause for cancellation of the billing notice. If no use has been made of the range, the applicant would have no further obligation to pay the fees assessed. (Specific procedures for handling delinquent accounts are provided in BLM 1375).

Subpart 4116 - L.U. Project Land -- added as another reference E. O. 10890 dated 10/27/60 which transfers certain lands in Utah (Widtsoe Project) to Interior from Agriculture.

During the last while or so I have rambled through various situations and the management guides provided. As you can see, it is impossible, although we may try, to write manual instructions or provide standards and specifications for every situation you may encounter. A man who relies entirely on guides of this nature instead of using his own basic training and understanding is little more than a live machine. Maybe if a man is up against a stone wall he does need some help. However, the individual who relies entirely on standards and specifications soon finds that every little obstacle that he comes to appears to him to be a stone wall and he is unable to get over it without convenient handles. We hope the manual instructions supply you with the tools to build your own ladders to fit the walls you encounter. We cannot or should not try to provide a ladder to fit all obstacles.

We know our range managers in the field have the background, training and imagination to analyze the situation as it exists and to use the Manual and handbook tools provided to do a good job of Resource Management.

RANGE AND WILDLIFE TRAINING WORKSHOP

April and May - 1966

Outside Grazing District Grazing Regulations and Manual - C. W. Luscher

I am sorry to say that these regulations and also the accompanying manual are still in the talking stage after some 2½ years of effort. However, I think we are about to make a break-through.

The proposed grazing regulations cover the conduct of management of rangelands outside the statutory grazing districts, exclusive of Alaska. This will include the previously identified Section 15, O&C and CBWR lands.

With the passage of the Classification and Multiple Use Act, it is particularly significant that these regulations be brought up-to-date and their arrangement and emphasis improved. The regulations will be oriented primarily toward management and not custodial. arrangements. They will conform quite closely with inside grazing district regulations, especially in format.

There has been a great need to correlate the O&C and PD grazing regulations more closely which this will do. In fact, it will eliminate both the O&C and Sec. 15 regulations presently in effect and replace them with one set of regulations.

Some of the more significant changes are as follows:

1. Authorize an association as a justified applicant.
2. Permit the district manager to designate lease areas on the basis of management requirements.
   a. This will permit common use of a lease area where division of the area in the past has resulted in mismanagement.
3. Provides greater flexibility:
   a. Permits changes in grazing use during the period of the lease.
   b. Provides for management plans which may be developed and initiated at any time during the life of the lease.
   c. Provides for adjustments in use during the life of the lease when management so dictates.
   d. Provides for establishment of number, AUM's and season of use.
4. Changes the basis for fees from an acre basis to AUM's.
   a. This will assist in possibly converting billings to ADP, thus reducing time and errors.
5. Change in assignment of leases.
   a. To reduce speculation and improper subleasing by attaching lease to private lands and can only be assigned by relinquishing control of the private lands on which the lease is based. If the leasee has no more use for the lease and wishes to get rid of it he can either assign the lease with his private property or relinquish it. The BLM will lease it again.
   b. This should provide better incentive for improved land management.

6. Require more consideration for other uses of the area.

   a. Clarifies forage allowances for wildlife.

   b. Provides for controlled grazing to protect reforestation, rehabilitation and recreation projects.

7. Provides for more control of range improvement projects.

   a. DM must specify type and design.

   b. Provides for quality projects.

   c. Provide for multiple use projects - example: DM can require antelope passes in fence or fencing reservoir and piping water to troughts.

   d. Also provides that if the leasee fails to abide by the requirements his lease is subject to cancellation.

8. One of the more controversial proposals is to require an access easement, when necessary, as a condition of the lease. This has many ramifications and will undoubtedly meet with opposition.

What are our present plans?

1. We plan to publish the regulations in the Federal Register as proposed rule making in the near future.
2. Allow 60 days for comments.
3. Modify the regulations on basis of comments received.
4. Final adoption of new regulations.

As you can readily see, this is not a speedy process and we will be doing well to have the regulations and manual in final shape for your use by late next fall.